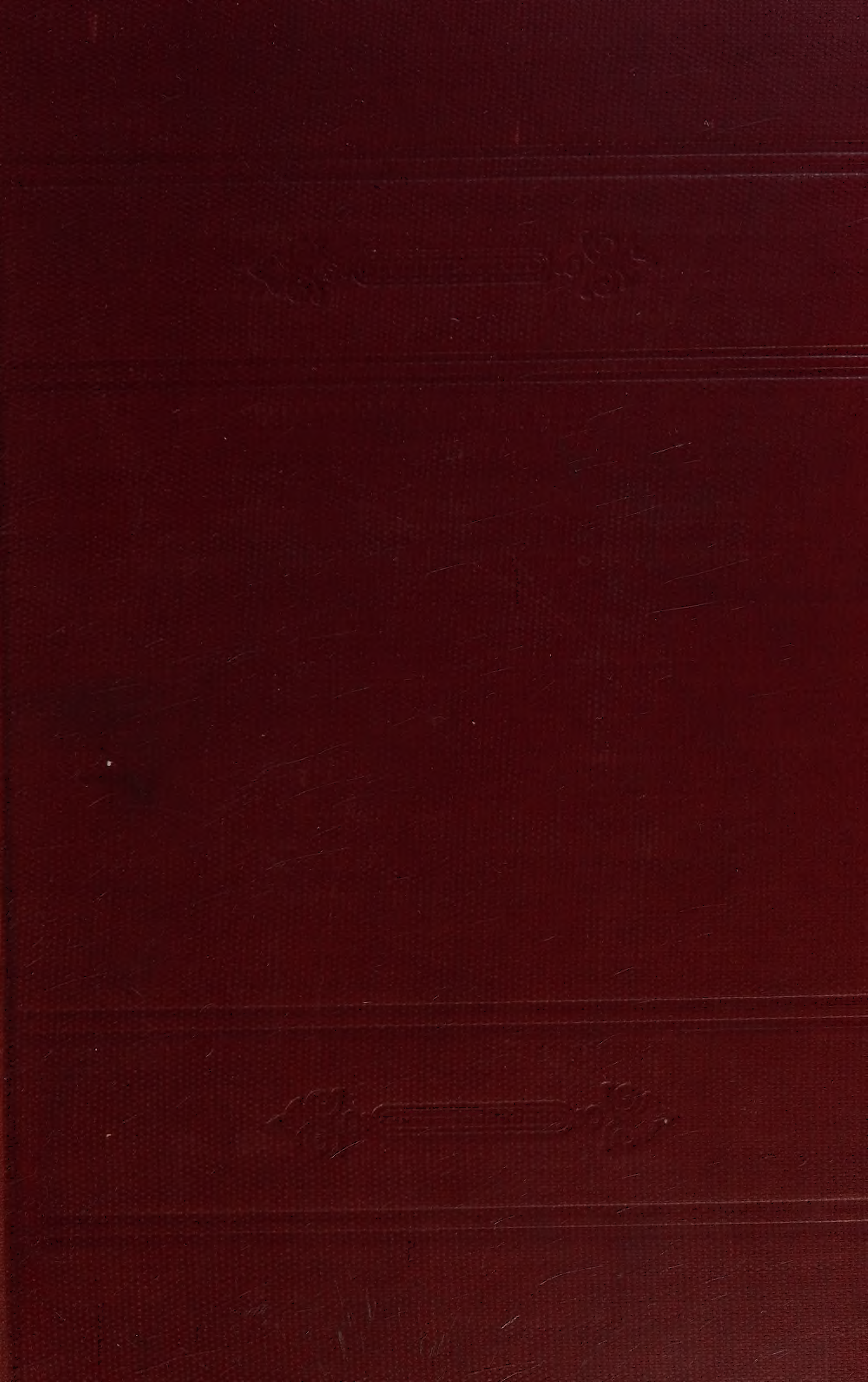

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U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

REPORT

OF THE

UNITED STATES COMMISSIONER OF FISHERIES

FOR THE FISCAL YEAR 1931

WITH

APPENDIXES

HENRY O'MALLEY
Commissioner

UNITED STATES
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ERRATA

Page 289: Box head *Anchor* should be *Gill net, anchor.*
Page 311, Figure 17: Catch of shad in Potomac River should be shown in the graph as 601,193 pounds instead of over 3,000,000.
Page 374, second line of text: *65 per cent* should be *15 per cent.*
Pages 504 and 505: In the box heads in the table *Leelanaw* should be *Leelanau.*
Page 551, eleventh line: *which ordinarily does take* should read *which ordinarily does not take.*

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U. S. DEPARTMENT OF COMMERCE

BUREAU OF FISHERIES

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HENRY O'MALLEY

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Department of Commerce,
Bureau of Fisheries,
Washington, July 1, 1931.

The honorable the Secretary of Commerce.

Dear Mr. Secretary: I have the honor to submit the following report of the operations of the Bureau of Fisheries during the fiscal year ended June 30, 1931.

The commercial fisheries of the United States and Alaska in the calendar year 1929 furnished employment to more than 191,000 persons, of whom 123,000 were fishermen and 64,000 were in the wholesale and manufacturing industries. The catch amounted to 3,567,000,000 pounds, returning to the fishermen $123,054,000. Commercial fishermen conduct their operations on the high seas, along the entire stretch of our extensive coast line, including Alaska, on the Great Lakes, and in interior waters.

Angling is followed in practically all waters capable of supporting fish life, and interest in this recreational pastime has tremendously increased. The Senate Special Committee on Conservation of Wild Life Resources estimates that there are 8,500,000 fishermen or anglers in the country and that the value of fishing tackle manufactured is approximately $25,000,000.

The national Bureau of Fisheries is concerned with the wise use of this great natural resource and its maintenance and extension without danger of exhaustion. The output of fish and eggs from its 88 stations and substations located in 35 States, Alaska, and the District of Columbia approximated 7,122,000,000 during the fiscal year ended June, 1931, and included marine, anadromous, and fresh-water species of commercial importance, as well as the highly prized game fishes. The bureau supplied 119 cooperative nurseries with over 4,000,000 young fish, increased its own output of fingerling fish by 28 per cent, and salvaged more than 182,500,000 fish in the Mississippi River section. Dependence on it for fish for stocking purposes was greatly increased because of the ruinous drought of the preceding season, in which many streams completely dried up. Added fish-cultural facilities provided for under the 5-year construction and maintenance program (act approved May 21, 1930) are being established as rapidly as possible.

The bureau's program of biological research included studies of 30 important food and game fishes, expansion of its program of research in the fields of experimental fish culture and oyster farming, and direct aids to the fishermen in forecasting the abundance of certain species, in effecting means for lessening the destruction of immature and undersized fish, and in determining what restrictions were needed to conserve the supply. The completion of a modern laboratory at Seattle, Wash., provides much needed facilities for the

Pacific coast biological staff of the bureau as well as for certain of its other personnel and the staff of the International Halibut Commission.

In the field of animal nutrition the bureau, in cooperation with other agencies, has been enabled to make noteworthy and timely contributions which have demonstrated the richness of domestic fish oils in vitamins A and D, thus extending their use in animal feeding. The relative feeding value of fish meals produced by the different processes of manufacture has been indicated, and the trade shown means for improving their manufacturing methods and eliminating waste. The assistance given has been especially timely because of the depressed fats, oils, and feeds markets and has resulted both to the advantage of the fish-reduction industry in increasing the demand for domestic products and to agriculture in making these products rich in certain factors available at lower cost. To meet the growing demands for investigations in this field, the bureau has been compelled to establish a nutrition laboratory in Washington, D. C., which is now in operation. There has also been set up a temporary fishery products laboratory at Gloucester, Mass., at which point important technological studies are being continued. In the collection of annual statistics of the catch the bureau was able to cover all sections except for certain fisheries of the Mississippi River.

Alaska fishery laws and regulations for the conservation of its fisheries have been executed vigorously in an effort to assure the maintenance of this great resource. The seal herd breeding on the Pribilof Islands has been built up until it now numbers considerably in excess of 1,000,000 animals, and the current season's killing of surplus males is expected to approximate 50,000.

With the appropriation of the sum of $6,075, available March 1, 1931, for the balance of the fiscal year for the enforcement of the law regulating the interstate transportation of black bass, as amended and approved July 2, 1930, the bureau proceeded with all possible promptness to organize a new division to perform the functions imposed by the law.

In the calendar year 1930 the fish-canning industry—the most important process of manufacture—packed 576,685,000 pounds, valued at $82,858,000. In excess of 80,000,000 pounds of fresh fish, valued at $12,500,000, was prepared for the market by the packaged fresh-fish trade, and 139,297,000 pounds of fish were frozen. Secondary fish products to the value of $23,721,000 were produced by the by-products industries. During the previous year the production of cured fish amounted to more than 110,000,000 pounds, valued at $17,500,000, and in 1930 imports of fishery products for consumption were valued at $50,830,000, while the value of domestic exports was $17,276,000. In comparison with 1929, there were decreases in the value of packaged fish, canned fish, secondary products, and imports and exports, while the production of frozen fish increased.

INTERNATIONAL RELATIONS

REVISED NORTHERN PACIFIC HALIBUT CONVENTION

The investigations of the International Fisheries Commission provided for under the convention with Great Britain and Canada, ratified October 21, 1924, have shown that the stock of northern

Pacific halibut is in a precarious condition, faced with ultimate exhaustion, unless the fishery is properly controlled. It will be appreciated that it is a complicated and difficult problem to exercise adequate control over a living organism, and particularly so when that organism is a species of fish inhabiting the depths of the ocean over a coastwise stretch of more than 2,000 miles. Under this convention the commission was required to make recommendations to the two Governments for concurrent action as to the regulations deemed necessary for the preservation and development of the fishery. It is a most difficult if not impracticable procedure to obtain consideration of minor regulations by the Congress of the United States and the Canadian Parliament each year. To provide a simpler, more responsive system of control a revised convention with Canada was signed on May 9, 1930, and became effective on May 9, 1931, by the exchange of ratifications at Ottawa. It was proclaimed by the President on May 14, 1931, and contains the following articles:

Article I

The nationals and inhabitants and fishing vessels and boats of the United States of America and of the Dominion of Canada, respectively, are hereby prohibited from fishing for halibut (Hippoglossus) both in the territorial waters and in the high seas off the western coasts of the United States of America, including the southern as well as the western coasts of Alaska, and of the Dominion of Canada, from the first day of November next after the date of the exchange of ratifications of this Convention to the fifteenth day of the following February, both days inclusive, and within the same period yearly thereafter.

The International Fisheries Commission provided for by Article III is hereby empowered, subject to the approval of the President of the United States of America and of the Governor General of the Dominion of Canada, to suspend or modify the closed season provided for by this article, as to part or all of the convention waters, when it finds after investigation such changes are necessary.

It is understood that nothing contained in this convention shall prohibit the nationals or inhabitants or the fishing vessels or boats of the United States of America or of the Dominion of Canada, from fishing in the waters hereinbefore specified for other species of fish during the season when fishing for halibut in such waters is prohibited by this Convention or by any regulations adopted in pursuance of its provisions. Any halibut that may be taken incidentally when fishing for other fish during the season when fishing for halibut is prohibited under the provisions of this Convention or by any regulations adopted in pursuance of its provisions may be retained and used for food for the crew of the vessel by which they are taken. Any portion thereof not so used shall be landed and immediately turned over to the duly authorized officers of the Department of Commerce of the United States of America or of the Department of Marine and Fisheries of the Dominion of Canada. Any fish turned over to such officers in pursuance of the provisions of this article shall be sold by them to the highest bidder and the proceeds of such sale, exclusive of the necessary expenses in connection therewith, shall be paid by them into the treasuries of their respective countries.

It is further understood that nothing contained in this convention shall prohibit the International Fisheries Commission from conducting fishing operations for investigation purposes during the closed season.

Article II

Every national or inhabitant, vessel or boat of the United States of America or of the Dominion of Canada engaged in halibut fishing in violation of the preceding article may be seized except within the jurisdiction of the other party by the duly authorized officers of either High Contracting Party and detained by the officers making such seizure and delivered as soon as practicable to an authorized official of the country to which such person, vessel or boat belongs, at the nearest point to the place of seizure, or elsewhere, as may be agreed upon. The authorities of the nation to which such person, vessel or boat belongs alone shall have jurisdiction to conduct prosecutions for the violation of the provisions of this Convention, or any regulations which may be adopted in pursuance of its provisions, and to impose penalties for such violations; and the witnesses and proofs necessary for such prosecutions, so far as such witnesses or proofs are under the control of the other High Contracting Party, shall be furnished with all reasonable promptitude to the authorities having jurisdiction to conduct the prosecutions.

ARTICLE III

The High Contracting Parties agree to continue under this Convention the Commission as at present constituted and known as the International Fisheries Commission, established by the Convention between the United States of America and His Britannic Majesty for the preservation of the halibut fishery of the Northern Pacific Ocean including Bering Sea, concluded March 2, 1923, consisting of four members, two appointed by each Party, which Commission shall make such investigations as are necessary into the life history of the halibut in the convention waters and shall publish a report of its activities from time to time. Each of the High Contracting Parties shall have power to fill, and shall fill from time to time, vacancies which may occur in its representation on the Commission. Each of the High Contracting Parties shall pay the salaries and expenses of its own members, and joint expenses incurred by the Commission shall be paid by the two High Contracting Parties in equal moieties.

The High Contracting Parties agree that for the purposes of protecting and conserving the halibut fishery of the Northern Pacific Ocean and Bering Sea, the International Fisheries Commission, with the approval of the President of the United States of America and of the Governor General of the Dominion of Canada, may, in respect of the nationals and inhabitants and fishing vessels and boats of the United States of America and of the Dominion of Canada, from time to time,

(*a*) divide the convention waters into areas;

(*b*) limit the catch of halibut to be taken from each area;

(*c*) fix the size and character of halibut fishing appliances to be used therein;

(*d*) make such regulations for the collection of statistics of the catch of halibut including the licensing and clearance of vessels, as will enable the International Fisheries Commission to determine the condition and trend of the halibut fishery by banks and areas, as a proper basis for protecting and conserving the fishery;

(*e*) close to all halibut fishing such portion or portions of an area or areas, as the International Fisheries Commission find to be populated by small, immature halibut.

ARTICLE IV

The High Contracting Parties agree to enact and enforce such legislation as may be necessary to make effective the provisions of this Convention and any regulation adopted thereunder, with appropriate penalties for violations thereof.

ARTICLE V

The present Convention shall remain in force for a period of five years and thereafter until two years from the date when either of the High Contracting Parties shall give notice to the other of its desire to terminate it.

This Convention shall, from the date of the exchange of ratifications be deemed to supplant the Convention between the United States of America and His Britannic Majesty for the Preservation of the Halibut Fishery of the Northern Pacific Ocean including Bering Sea, concluded March 2, 1923.

ARTICLE VI

This Convention shall be ratified in accordance with the constitutional methods of the High Contracting Parties. The ratifications shall be exchanged at Ottawa as soon as practicable, and the Convention shall come into force on the day of the exchange of ratifications.

PASSAMAQUODDY POWER PROJECT

By joint resolution (Pub. Res. No. 83, 71st Cong.) approved June 9, 1930, Congress authorized an appropriation to defray the United States' share of the expenses of an investigation, to be made jointly by the United States and Canada, of the probable effects on the fisheries of the proposed international developments to generate electric power from the movements of the tides in the Passamaquoddy and Cobscook Bays region. The President appointed Henry O'Malley, Commissioner of Fisheries, and O. E. Sette, in charge of North Atlantic fishery investigations of this bureau, as the United States commissioners to conduct the investigations. Wm. A. Found, Deputy Minister of Fisheries, and Prof. A. G. Huntsman, of the Biological Board of Canada, were appointed to represent Canada.

The commission met on June 8, 1931, in Montreal to organize and to consider arrangements for initiating the investigation. Mr. Found was chosen chairman and plans were made for the selection of four responsible investigators to conduct investigations on zooplankton, phytoplankton, oceanic chemistry, physical oceanography, and fisheries. The investigations are planned along the following lines:

1. Detailed study of the occurrence of the herring in relation to various environmental conditions as an indication of how its availability in the fishery might be affected by the construction of the dams.
2. A study of the abundance of phytoplankton and zooplankton (as a basis for fish life) in relation to the physical and chemical states of the water in the Bay of Fundy and along the coast of Maine.
3. Detailed examination of existing hydrographic conditions as indicating the relative importance of the water mixing at the mouth of Passamaquoddy Bay as determining the physical and chemical states of the water in the Bay of Fundy and along the coast of Maine. The commission and investigative staff will be aided by an advisory committee of four scientists. For Canada these are: Prof. F. R. Hayes, zoological department, Dalhousie University, and Dr. A. W. H. Needler, in charge of oyster investigations; and for the United States, Dr. H. B. Bigelow, director of the Woods Hole (Mass.) Oceanographic Institution, and Prof. A. E. Parr, curator, Bingham oceanographic collection, Yale University.

NORTH AMERICAN COUNCIL ON FISHERY INVESTIGATIONS

The council held its seventeenth meeting in Washington, D. C., on November 6 and 7, 1930, with representatives from Canada, France, Newfoundland, and the United States present. The meeting concerned itself with a wide range of subjects dealing with the practical and scientific problems of our North Atlantic fisheries in keeping with its purpose to coordinate the program of research along eminently practical lines. Reports on investigations of the cod, haddock, mackerel, herring, and squid fisheries, the Passamaquoddy power project, ocean currents and temperatures, and fishery statistics were received. Dr. Ed. le Danois, director of the marine-fisheries work in France, gave a very interesting account of the movement of North Atlantic waters and their effects on the fisheries, and the Hon. H. B.

C. Lake, Minister of Marine and Fisheries of Newfoundland, emphasized the seriousness of the bait situation and need for assuring to the fishermen adequate supplies of bait material. Dr. Harold Thompson, a well-known investigator of the Scottish Fishery Board, who is cooperating with the Newfoundland Government in working out a program of fishery research, was present.

INTERNATIONAL COLONIAL EXPOSITION AT PARIS

In connection with the participation by the Government of the United States in the International Colonial and Overseas Exposition at Paris from May 1 through October, 1931, the bureau prepared an appropriate display regarding the fishery and fur-seal industries of Alaska. The articles assembled included a life-size reproduction of a chinook salmon, models of salmon steaks and fillets, salmon and clam cans and labels, a mounted fur seal, several dressed and dyed fur-seal skins, and two fur-seal coats. Appropriate photographic presentations were also included.

CONSERVATION OF WHALES

At one period the United States led all nations in the prosecution of the whale fisheries. It still produces from one to one and a half million gallons of whale oil and imports over seven million gallons, making it a large consumer of this product.

During the past quarter of a century the prosecution of this fishery on all seas has been greatly intensified. The development of floating factory ships with a displacement up to 30,000 tons or more, some of the larger with storage space for three and one-half to six million gallons of oil, has made possible an intensive exploitation of the fishery in Antarctic waters. The mother ship is accompanied by a fleet of "killers," smaller swift vessels, to scour the seas and tow the catch to the factory ship. On some of these factory ships there is provision for hauling the whales aboard for cutting up, thus greatly simplifying reduction operations.

The world catch of whales increased from about 12,000 in the calendar year 1920 to more than 27,500 in 1929, and the production of whale oil increased from nearly 20,400,000 gallons to 93,400,000 gallons in this 10-year period.

This intensified pursuit of whales in practically all seas of the globe has aroused grave concern lest the supply be exhausted and the investment in the industry, which has yielded over $60,000,000 in products in a year, be jeopardized. Because of the cosmopolitan character of whales and the number of countries engaged in the fishery, regulation would appear necessary by international agreement. In Europe some provision for the study of the subject has been made, and several nations have applied some restrictions on the operation of their nationals. In this country the question is receiving attention by the Special Committee on Wild Life Resources of the United States Senate, the American Society of Mammalogists, and other conservation agencies.

Among the protective measures which should receive attention are the prevention of the capture of certain of the rarer species, the killing of immature whales of whatever species, and the undue exploitation of the fishery as a whole. It may be necessary to provide for the licensing of whaling companies, setting forth the terms under which they shall operate, including as complete utilization of the animals killed as is practicable. It is also highly important that an international agency be established for a more intensified study of the trend of the fishery, the need for regulations, and the character of regulations essential to prevent the exhaustion of the supply, with as little interference with commercial operations as possible.

JAPANESE VESSELS IN BERING SEA

The summer of 1930 marked the advent of Japanese vessels in Bering Sea waters adjacent to the Alaskan coast for the packing of crabs. The floating cannery steamer *Taihoku Maru*, a vessel of over 7,000 tons, accompanied by the steam beam trawler *Myogi Maru* and a number of power launches, was operated about 20 miles offshore from Nelson Lagoon on the Alaska Peninsula. A pack of upward of 20,000 cases of crabs was made. The trawler *Kokusai Maru*, a vessel 118 feet in length, engaged in experimental fishing in Bristol Bay waters 15 or more miles offshore in August, 1930, a small take of cod, crabs, and halibut resulting. In addition, the Japanese Government vessel *Hakuyo Maru* made a trip in 1930 to waters of Bering Sea. This is a training ship of the Imperial Fisheries Institute of Tokyo and is a modern steel vessel of about 2,000 tons. In the summer of 1931 the floating cannery *Nagato Maru* was engaged in the packing of crabs in Bering Sea waters a few miles north of the Alaska Peninsula.

DOMESTIC RELATIONS

AID TO OUR ISLAND DEPENDENCIES

Hawaiian pearl oysters.—At the invitation of the Territorial government of Hawaii, the bureau detailed its oyster expert, Dr. P. S. Galtsoff, to an investigation of the newly discovered pearl-oyster resources of Pearl and Hermes Reef for the purpose of developing a conservation policy. Transported from Honolulu on July 15, 1930, by the Navy mine layer *Whippoorwill* and accompanied by 3 Philippine divers, Doctor Galtsoff spent 5 weeks in making a series of biological investigations at 75 stations in the lagoon where the oysters occur. Pearl oysters were found at depths from 10 to 47 feet, attached almost exclusively to live corals. All oyster reefs examined showed obvious signs of depletion. One-year-old oysters were very few in number. The oysters spawn in July and August. It is estimated that since 1927, when these beds were discovered, not less than 100 tons of shells (about 106,000 oysters) were taken; and, without protection, the beds will be completely wiped out in a short time. The closure of the beds to fishing for a period of 3 to 5 years was recommended. Several hundred live oysters were brought back to Honolulu and planted in Kaneohe Bay, where conditions appeared to be suitable for their growth and propagation. An examination of this stock made on April 17, 1931, disclosed that the oysters were doing well, those examined having nearly doubled in size since they were planted in the previous September. The Territorial government is making arrangements to bring more oysters from Pearl and Hermes Reef in the continuance of the restocking policy.

Fisheries of the Virgin Islands.—R. H. Fiedler and N. D. Jarvis, on May 2, 1931, were detailed to conduct a survey of the fisheries of the Virgin Islands of the United States with a view to alleviating the present economic plight of these islands. Work began on May 15, 1931, in St. Thomas, and the preliminary survey was completed on May 30, 1931. The survey revealed that during the calendar year 1930 the fisheries of the Virgin Islands of the United States employed 405 fishermen. Their catch amounted to 616,000 pounds of fishery products valued at $49,080 to the fishermen. In making the catch the fishermen used 1 motor boat, 38 sailboats, and 147 rowboats. The gear employed consisted of 40 haul seines, 90 tangle nets (turtle), 113 cast nets, 297 lines, and 1,600 set pots. About one-third of the total catch was made by set pots, one-third by seines, and one-third by lines or other types of gear, and by hand. In addition, it was determined that the industry in the islands is faced with the problem of marketing the catch now obtained rather than the lack of a sufficient supply. There is reason to believe that there are many times throughout the year when the local markets are glutted with fish, making it impossible to dispose of the catch. Two plans appeared feasible for relieving the situation. These are: (1) Expand the market for fresh fish; (2) establish a local fish-curing industry to replace imported cured fish. In order to further these plans Mr. Jarvis remained in the islands for several weeks to conduct experiments along these lines. These experiments have proved successful; and if the findings are adopted it is believed that the economic welfare of the fisheries of the islands will be materially improved.

FISHERIES CONFERENCES

On October 27 and 28, 1930, the bureau was represented at an important interstate fishery conference at Savannah, Ga., called by the fish and game commissioner of Georgia to consider various fishery problems of common interest to North Carolina, South Carolina, Georgia, and Florida, with special reference to oysters, shad, and shrimp. The conference adopted a resolution favoring extension of private oyster culture and the application of modern methods of oyster farming, also one favoring restriction of the shad fisheries, protection of spawning grounds, and provision for escapement of a sufficient spawning reserve.

At the invitation of the Commissioner of Fisheries, conservation officials and leading conservationists of Maryland, Virginia, West Virginia, Pennsylvania, and the District of Columbia met at the bureau on December 9, 1930, to formulate a program for the rehabilitation of the game fishes, particularly the black bass, the control of pollution, and the protection of the shad in the Potomac River.

Resolutions were passed recommending (1) uniform laws governing the fisheries in boundary waters; (2) measures designed to afford the black bass proper protection; (3) effective laws for the protection of the shad; (4) the enactment of legislation by the States for more complete sewage and trade waste disposal; (5) provisions for cooperative study on means for disposing of industrial wastes; and (6) the prevention of the pollution of streams.

In providing effective cooperation with the Federal Government in the enforcement of the black bass law it was recommended that the States (1) prohibit the sale of black bass whether taken within or without the State; (2) provide entire closure to fishing during the spawning season of the bass; (3) prohibit the export of bass, allowing the nonresident licensee to carry out a 2-day bag limit; (4) provide a uniform size limit; and (5) provide a daily bag limit; and further that the Federal and State agencies increase their output of young bass to care for the demand from private cooperative agencies desirous of rearing the young to fingerling sizes for stocking purposes and for more generous plantings in the streams.

COOPERATION WITH STATES

With the work of the bureau extending into every State, cooperative arrangements are frequently entered into with the various agencies engaged in similar work. This prevents duplication of effort and effects a considerable saving of money for all concerned.

In its limnological survey of Lake Erie the bureau has been aided by the States of Ohio and New York. Similar arrangements exist with Wisconsin in the lake work of that State. Cooperative arrangements with Georgia, Louisiana, and Texas in the shrimp work have greatly enlarged its scope, the two former States financing the operations of two of the bureau's vessels assigned to their waters. California is assisting with the trout and steelhead salmon studies on the Pacific slope. The oyster work of the bureau has been materially aided by the cooperation of Virginia, North and South Carolina, Georgia, Oregon, and Washington. In the fish cultural work the Rocky Mountain States have been very helpful in the program of restoring the depleted streams of this popular fishing section to former abundance by mutually beneficial cooperative egg collecting and rearing operations. In addition, cooperation has been received in this work from many of the other States, notably Michigan, Minnesota, Washington, and Oregon. In so far as personnel is available expert advice has been freely granted to State and private fish-culturists in the solving of their various problems. Exceptional cooperation also has been received in the collection of statistics. Many States furnish data so complete that only supplemental surveys need be made by the bureau's agents. In the enforcement work of the new black bass law the bureau, on account of limited funds, has had to depend on State help and cooperation to expedite the program. This has been freely given, and many of the States are assisting by allowing the appointment of their regularly employed State fish and game protectors to the cooperative position of Federal black bass law inspectors, for which they receive no remuneration, thus rendering a distinct service in a very material way.

In addition to the States, the Navy Department, through the transporting of supplies to the Pribilof Islands, has given valuable and much appreciated aid and, together with the War Department, has loaned vessels for other services as well. The United States Forest Service and the National Park Service rely upon the bureau for fish for stocking the streams and lakes in their reservations and cooperate to the fullest extent.

FIVE-YEAR CONSTRUCTION AND MAINTENANCE PROGRAM

The act of May 21, 1930 (46 Stat. 371), entitled "An act to provide for a 5-year construction and maintenance program for the United States Bureau of Fisheries," authorized, among other things, the establishment, during the fiscal year 1931, of fish cultural stations in New Mexico, Louisiana, and Idaho; fish cultural substations in Wisconsin, Montana, Colorado, and New Hampshire; a fishery laboratory in the State of Washington; and an experimental bass and trout station in Maryland or West Virginia. A total of $505,000 was authorized to be appropriated for the establishment of these projects. The second deficiency act, fiscal year 1930, appropriated $265,000 for the fiscal year 1931 to enable the bureau to establish or to commence the establishment of these projects.

Sites suitable for the establishment of the fish-cultural substation in New Hampshire and for the fishery laboratory in the State of Washington were available on land already owned by the United States and consequently their establishment was begun early in the fiscal year and practically completed. The New Hampshire station is located in the White Mountain National Forest near the town of West Milan. The laboratory is located at 2725 Montlake Boulevard, Seattle, Wash., on land known as the "Old Lake Washington Canal right of way."

Sites near Natchitoches, La., Leadville, Colo., and Charles Town, W. Va., were acquired for the establishment of the stations in those States and construction was begun during the year.

Sites near Dexter, N. Mex., Gooding, Idaho, and Lake Mills, Wis., were selected for the stations to be established in those States; but title to these sites was not perfected during the fiscal year, and necessarily construction could not be begun.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

INTRODUCTION

The operations of the fish-cultural division of the Bureau of Fisheries include the propagation and distribution of marine and fresh-water fishes. As a result of such activities during the fiscal year 1931, 7,121,806,000 fish and eggs were produced and distributed. This represents a decrease in output of 448,677,000 as compared with the preceding year.

Two important facts to be taken into consideration in comparing the output of one fiscal year with that of another are the amount of equipment employed and the size of the fish produced. The equipment in operation during 1931 was essentially the same as in 1930. Carp propagation was suspended at the Put in Bay (Ohio) station. Ponds for warm-water fishes were constructed in rice fields in the vicinity of Orangeburg, S. C. At Pyramid Lake, Nev., extensive collections of black-spotted trout eggs were made. Black bass ponds covering an area of approximately 4 acres were completed at the Cape Vincent (N. Y.) station and placed in operation. These changes were not of great magnitude, and the equipment employed during the two years may be considered on an approximately equal basis.

The experience gained in the planting of large fingerling and yearling trout, salmon, and other fishes that can be reared to fingerling and yearling sizes has demonstrated that the distribution of such fishes in the egg and fry stages should not be resorted to except when lack of adequate facilities makes it imperative. The significance of the planting of 1,000 large fingerling fish might easily overshadow the planting of many times that number of fish of the same species in the fry stage. Because of this fact much of the expansion of fish-cultural equipment and effort for the production of certain fishes has taken place with the view to producing fish of larger size rather than increasing the numerical output.

The continued efforts put forth by the bureau to produce larger fish have resulted in the distribution of a greater proportion of the output in the fingerling stage. Such increase in the fiscal year 1931 as compared with the fingerling production of the preceding year amounted to 28 per cent. Since these larger fish require more space and care than fish in the fry stage, it might be assumed that the total production of the hatcheries in operation would be proportionately reduced. As a matter of fact, however, only two species of salmon—steelhead and chum—showed any appreciable decrease in numbers as compared with 1930, while the chinook, sockeye, humpback, and Atlantic salmons showed a substantial increase in production. The output of the other salmons and trout handled did not vary markedly from the figures of the preceding year.

There was an increased output of practically all the important commercial and game species handled, and in the case of the shad, herring, cisco, pike perch, and winter flounder such increases were large. The decline in the total output may be ascribed largely to a falling off in the production of cod and pollock, such decrease amounting to 1,135,999,000. These species are distributed in the egg and fry stages, and the egg collections are dependent upon the weather conditions encountered rather than upon the efficiency and effort put forth by the egg-collecting crews. Aside from the cod and pollock operations, the fiscal year 1931 may be regarded as a most successful year from a propagation and distribution standpoint. The year's output, classified according to the character of the fishes handled, may be summarized as follows:

	Number
Game fishes:	
Warm-water species—	
Basses	4, 370, 000
Sunfish	12, 653, 000
Crappie	28, 549, 000
Pike and pickerel	3, 927, 000
Catfish	84, 521, 000
Other	101, 000
Cold-water species:	
Trouts—	
Brook	16, 296, 000
Rainbow	13, 389, 000
Loch Leven	16, 702, 000
Black-spotted	16, 095, 000
Golden	25, 000
Grayling	1, 003, 000
Landlocked salmon	708, 000

	Number
Commercial fishes:	
Anadromous species—	
Shad	19,490,000
Glut herring	50,000,000
Striped bass	9,500,000
Salmon—	
Atlantic	3,969,000
Pacific	175,748,000
Interior waters (including Great Lakes) species—	
Whitefish	157,415,000
Cisco	63,400,000
Lake trout	25,729,000
Pike perch	195,353,000
Yellow perch	115,298,000
Carp	138,023,000
Buffalofish	115,488,000
Marine species—	
Cod	1,525,298,000
Haddock	447,428,000
Pollock	240,219,000
Winter flounder	3,604,668,000
Mackerel	10,461,000
Miscellaneous fishes	25,980,000
Total	7,121,806,000

PROPAGATION OF COMMERCIAL SPECIES

Marine species of the Atlantic coast.—As the fishes propagated by the bureau in this section are extremely prolific, the eggs are taken in immense numbers. Most of them are incubated in hatcheries and the fry liberated soon after hatching. However, the low-water density experienced in some of the egg-collecting fields makes it imperative to plant the green eggs on the spawning grounds immediately after fertilization has been accomplished. A considerable increase may be noted in the distribution of haddock and winter flounder. On the other hand, the production of cod and pollock fell far short of the results with these species in the preceding year.

Pacific salmon.—The output of Pacific salmon was considerably in excess of last year's production. Owing to the more favorable conditions existing on the spawning grounds in the Columbia River and in California, the egg collections of the chinook salmon exceeded those of last year by more than 40,000,000. More eggs of the humpback salmon than last year were taken in the Afognak (Alaska) field.

Anadromous species of the Atlantic coast.—A comparatively successful year was experienced in the propagation of shad. A prolonged period of cool weather lengthened the spawning season, and while the egg collections did not equal those in the spring of 1929, they exceeded the take in 1930 by a substantial margin. Eggs of the striped bass were again collected at Weldon, N. C., after a year of no production in 1930. Atlantic salmon propagation was augmented at the Craig Brook (Me.) station by the acquisition of several million additional eggs from Canadian hatcheries, and at Edenton, N. C. the 1930 take of herring eggs was surpassed by upward of 70,000,000.

Commercial species of interior waters.—Increases over 1930 figures may be noted in the 1931 distributions of the fishes coming under this head. Pike perch and cisco showed large increases, the Put In Bay (Ohio) station producing a very satisfactory output of the former. The whitefish production exceeded that of 1930, due mainly to more satisfactory working conditions in the Michigan field. Notwithstanding the fact that carp propagation was suspended at the Put In Bay station, a large increase in the carp output was made possible through operations conducted at Bellevue and Guttenberg, Iowa, in the La Crosse (Wis.) field.

PROPAGATION OF GAME FISHES

Although a number of the commercially important fishes are sought by anglers for their sporting qualities, many of them are not included in the category of game fishes. Only the trouts, basses, sunfish, crappie, catfish, pike, pickerel, grayling, and related forms are comprised under that heading.

During the year difficulties were experienced at some of the pondfish stations on account of the prevailing drought. Large losses of black bass and other pondfishes were also sustained because of the varying weather conditions experienced during the spawning season. Notwithstanding these handicaps, however, the year's distribution of the pondfishes was only slightly lower than in 1930. In all sections a sufficient number of the various species was produced to fill all applications on file and to allow for the utilization of an ample surplus for carrying on extensive cooperative activities with States, sportsmen's organizations, and individuals.

RESCUE OPERATIONS

The extent of the rescue work in the Mississippi River territory exceeded that of the previous year. The total of salvaged fish handled in the fiscal year 1931 amounted to 182,534,861, and of this number less than 1 per cent was used to fill applications outside of the rescue district. Weather conditions were unusually favorable during the season, and the number of fish rescued constituted a new record. The results of the rescue work in the fields surrounding the Fairport (Iowa) biological station were also very successful.

COOPERATIVE ACTIVITIES

The cooperative nursery system has become an integral part of the bureau's propagation work. Through its activities the bureau has been enabled to extend materially the scope of its fish-cultural operations. The removal of large numbers of young fish to be reared at the nurseries has reduced the mortality formerly resulting from the crowded condition of the hatcheries and has made possible the concentration of effort in rearing the retained stock to a comparatively large size prior to distribution. While the drought and other conditions caused the suspension of activities at a number of these establishments, the 119 in operation received for rearing during the year a total of 4,109,622 young fish produced at the bureau's hatcheries.

STATISTICAL SURVEYS

The statistical work of the division of fishery industries includes the collection and dissemination of biological and trade-fishery statistics. Continued progress was made toward the collection of annual statistics of the entire country by the cooperation of State fishery agencies and by the use of automobiles by agents. As a result, catch statistics for 1929 were obtained for the fisheries of the entire United States with the exception of certain fisheries of the Mississippi River and tributaries.

FISHERIES OF THE UNITED STATES AND ALASKA

New England States.—In the calendar year 1929 the fisheries of Maine, New Hampshire, Massachusetts, Connecticut, and Rhode Island employed 17,160 fishermen, or 3 per cent more than in 1928. The catch amounted to 694,286,086 pounds, valued at $29,072,566—an increase of 15 per cent in the catch and 13 per cent in value as compared with 1928.

In 1930 landings of fish by American vessels at Boston and Gloucester, Mass., and Portland, Me., amounted to 350,801,470 pounds as landed, valued at $12,785,452—an increase of 7 per cent in volume over 1929.

The catch of the mackerel fishery in 1930 amounted to 43,156,885 pounds, which is a decrease of 7 per cent as compared with 1929.

In 1930 the packaged-fish trade in New England decreased 7 per cent in amount and 18 per cent in value as compared with 1929.

The sardine canners in Maine packed 1,399,212 standard cases, valued at $4,459,071, during 1930—a decrease of 31 per cent in quantity and 35 per cent in value as compared with 1929.

Middle Atlantic States.—In the calendar year 1929 the fisheries of New York, New Jersey, Pennsylvania, and Delaware employed 10,491 fishermen, or 5 per cent more than in 1926, the most recent year for which statistics are available prior to 1929. The catch amounted to 190,772,611 pounds, valued at $14,137,608—an increase of 14 per cent in the catch and 13 per cent in the value of the catch as compared with 1926. Landings of fish at New York City and Groton, Conn., amounted to 57,255,000 pounds in 1930, or 24 per cent less than in 1929.

On the Hudson River the shad fishery was carried on by 243 fishermen in 1930, who caught 206,504 pounds of shad, valued at $33,372—a slight increase over 1929.

Chesapeake Bay States.—In the calendar year 1929 the fisheries of Maryland and Virginia employed 18,470 fishermen, or 26 per cent less than in 1925, the most recent year for which records are available prior to 1929. The catch amounted to 274,673,437 pounds, valued at $11,580,628—a decrease of 18 per cent in the catch and 17 per cent in the value of the catch as compared with 1925.

In 1930 the shad and alewife fisheries of the Potomac River were prosecuted by 608 fishermen, who caught 601,193 pounds of shad, valued at $98,041, and 3,114,918 pounds of alewives, valued at $49,315.

South Atlantic and Gulf States.—In the calendar year 1929 the fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas employed 26,643 fishermen, or 7 per cent less than in 1928. The catch amounted to 535,394,859 pounds, valued at $14,903,945—an increase of 18 per cent in the catch and a decrease of 7 per cent in the value as compared with 1928.

In 1930 sponges sold on the exchange at Tarpon Springs, Fla., amounted to 414,082 pounds, valued at $802,938. This is an increase of 9 per cent in quantity and 14 per cent in value over 1929.

Pacific Coast States.—In the calendar year 1929 the fisheries of Washington, Oregon, and California employed 19,992 fishermen, or 1 per cent more than in 1928. The catch was the largest and most valuable on record, amounting to 1,034,433,666 pounds, valued at $25,038,414—an increase of 47 per cent in the catch and 22 per cent in the value over 1928.

In 1930 the total catch of halibut by United States and Canadian vessels amounted to 49,408,000 pounds, valued at $4,974,000—a decrease of 11 per cent in quantity and 26 per cent in value as compared with 1929.

Lake States.—In the calendar year 1929 the lake fisheries (Lakes Ontario, Erie, Huron, Michigan, Superior, and Namakan, Lake of the Woods, and Rainy Lake) of the United States and Canada produced 114,826,907 pounds of fish and shellfish. Of the total, the United States accounted for 85,389,467 pounds, valued at $6,787,750. The total catch showed an increase in 1929 over 1928, due largely, however, to a revised and more complete method of collection used in the lake fisheries in 1929.

Mississippi River and tributaries.—During the calendar year 1930 the catch of fresh-water mussel shells amounted to 59,490,000 pounds, valued at $1,092,156—an increase of 9 per cent in the quantity and a decrease of 18 per cent in the value as compared with 1929. The pearl-button industry, centered in Iowa, manufactured pearl buttons and various novelties from fresh-water mussel shells valued at $5,007,419 in 1930. The fisheries of Lakes Pepin and Keokuk decreased in 1930 as compared with 1929.

MANUFACTURED PRODUCTS

Canned products.—During the calendar year 1930, 464 establishments canned fishery products in the United States and Alaska amounting to 14,767,186 standard cases (576,685,454 pounds), valued at $82,858,261. This is a decrease of 18 per cent in the value as compared with 1929. Salmon canned on the Pacific coast accounted for 6,086,479 standard cases (292,150,992 pounds), valued at $42,835,953. This is 52 per cent of the total value. Sardines canned in California and Maine and tuna and tunalike fishes canned in California each accounted for 16 per cent of the total value. The remainder of the production consisted principally of shrimp, clam products, and oysters.

By-products.—During the calendar year 1930 by-products worth $23,720,778 were manufactured. Excluding marine-pearl shell products, statistics for which were not included in 1929, there was a decrease of 19 per cent in the value of the production. The most important by-products were marine-animal meals and scrap, fresh-water mussel-shell products, marine-pearl shell products, marine-animal oils, and oyster-shell products. Products of lesser importance were liquid glue, herring skins and scales, shark skins, fins, and meat, agar agar, pickled whale meat, whalebone, and isinglass.

Cured products.—The production of cured fishery products in the marine and lake sections of the United States and Alaska in the calendar year 1929 amounted to 116,267,121 pounds, valued at $17,822,253. Of this amount 72,842,774 pounds, valued at $7,038,425, were salted; 36,490,815 pounds, valued at $9,446,612, were smoked; 4,746,634 pounds, valued at $1,214,205, were dried; and 2,186,898 pounds, valued at $183,011, were spiced. Mild-cured salmon was the most valuable salted product, salmon the most valuable smoked product, shrimp the most valuable dried product, and alewives the most important spiced product.

Packaged fresh, frozen, and smoked products.—During the calendar year 1930 packaged fresh, frozen, and smoked products were produced in 128 plants operated in 15 States. The output amounted to 80,013,572 pounds, valued at $12,579,664—a decrease of 5 per cent in quantity and 15 per cent in value as compared with 1929.

Frozen products.—In the calendar year 1930 the freezing plants in the United States and Alaska packed 139,297,228 pounds of frozen fishery products, with an estimated value in the cold-storage warehouses of $16,500,000. This is the largest frozen pack on record and is an increase of 15 per cent over 1929. The most important frozen products were the group consisting of cod, haddock, haddock fillets, hake, and pollock; salmon; halibut; mackerel; whiting; and sea herring.

FISH-FARMING INDUSTRIES IN THE UNITED STATES

As a continuation of the work started in the calendar year 1928 when the goldfish industry was surveyed, the fish-farming industry was further studied in 1930 to include the trout and pondfish industries. It was found that there were 133 trout and 11 pondfish establishments commercially active in 1929. The products marketed in the trout industry were valued at $1,072,700, and in the pondfish industry they were valued at $21,444.

FOREIGN FISHERY TRADE

The value of the United States foreign trade in fishery products during the calendar year 1930 amounted to $68,105,230, of which $50,829,653 represents the value of the imports for consumption and $17,275,577 the value of exports. Compared with the previous year, this is a decrease of 25 per cent in total trade, 24 per cent in the value of imports, and 28 per cent in the value of exports.

TECHNOLOGICAL INVESTIGATIONS

The technologists of the division of fishery industries have been conducting research mainly on problems relating to improvements in methods of handling fresh fish, by-products and production methods, net preservation, and the nutritive value of marine products.

IMPROVEMENTS IN METHODS OF HANDLING FRESH FISH

During the year the bureau established a refrigeration laboratory at the municipal fish market in this city for the purpose of continuing preliminary studies on the evaporation of moisture from frozen fish, the rusting of frozen fish, the losses incurred through leaching of fish packed in ice, and the freezing of oysters. In the studies on the evaporation of moisture from frozen fish, the samples of fish were given several different treatments and stored in a constant temperature approximating the conditions of a commercial freezer as far as possible. One treatment showed up particularly well, reducing the evaporation of moisture from 23 per cent in the untreated fish to 5 per cent in the treated fish. In studying the losses incurred through the leaching of fish packed in ice, preliminary experiments indicated losses of as high as 4 pounds per ton over a period of 7 days. This, apparently, is not a great loss until it is multiplied by the amount of fish handled in crushed ice over a period of a year. It then begins to assume proportions which are really surprising. It has been recognized for several years and should be emphasized that these losses represent some of the most important constituents of the fish from a nutrition standpoint, as the leachings contain large quantities of the minerals and a part of the flavor of the fish.

During the past year experiments have been conducted on freezing oysters. If rapidly frozen oysters could be introduced for consumption in the summer months and the public induced to buy them, the annual output of the producers could be materially increased. Our experiments have demonstrated that oysters can be rapidly frozen and placed in cold storage for several months without impairing the taste.

At the time that the above-described experiments were being conducted, at the request of the authorities of the District government, our technologist offered suggestions which would tend to increase the attractiveness of the municipal fish market. These dealt with the sanitary conditions, improvements in refrigeration facilities for the stores, and general recommendations.

BY-PRODUCTS AND PRODUCTION METHODS

Activities in this section of technology consisted in the completion of studies on the menhaden industry, manufacturing fish oils of higher vitamin potency, cooking and pressing fish, and reduction of nonoily fish waste.

The menhaden studies disclosed means for the elimination of wastage in the various stages of the factory process, the more efficient operation of machinery, possible improvements in the design of existing machinery, and the introduction of new machinery.

It has been shown that menhaden press liquors contain approximately 22 per cent of the total solids of the original material, and of this amount about 17 per cent is dissolved material and about 5 per cent is suspended material. Under present operating conditions, all dissolved materials are discarded and only about one-third of the suspended materials are recovered. Yet, by treating press liquors with a chemical coagulant, such as aluminum sulphate, and passing the liquors through a pressure filter, the oil and water emulsion is broken and all suspended and about one-third of the dissolved solids may be recovered. Furthermore, such treatment may be expected to give a greater oil recovery.

It was demonstrated that the type of flame drier used at present in the industry causes a loss of over 10 per cent of the monetary value of the scrap dried, and that the use of steam tube driers will reduce the present loss in monetary value of dried scrap by over 50 per cent. In addition to this advantage, preliminary feeding tests indicated that steam-dried menhaden meal has greater nutritional value than the flame-dried product. Another important discovery was the fact that storing of oil in open tanks at the factory causes an increase in the free fatty acid content of the oil.

Special studies have been made of the effect of different methods of manufacture on the quality and nutritive value of the finished products. It has been shown that the intrinsic value of both fish meal and fish oil can be greatly improved through changes in manufacturing methods. Heat and oxidation, both in intensity and duration, are the great destroyers of the nutritional value of foods and feedstuffs. Therefore, any food manufacturing process which minimizes the destructive effect of heat and oxidation contributes greatly to the quality and nutritive value of the manufactured product in question.

NET PRESERVATION

Net preservation studies dealt with trap nets and gill nets. Chemicals of the antioxidant class and bactericides were found to be valuable materials, in general, for treating nets. The proper handling of nets and preservative treatments, including the application of preservatives to nets, was studied in order to cut down labor cost and to minimize fire risk.

So many factors enter into the problem of prolonging the life of nets that these investigations have been pursued along four general lines of study as follows: (1) Development of chemical preservatives, (2) method of application of chemicals to textiles, (3) differences in deterioration by localities, and (4) yearly variability of deterioration in one locality.

NUTRITIVE VALUE OF MARINE PRODUCTS

Marine products represent an important food supply. These products are, generally speaking, rich in vitamins, and minerals in quantity and variety.

Cooperative research with the Bureau of Chemistry and Soils, U. S. Department of Agriculture, on fish oils, fish meals, fish flour, and oysters has been continued. Chemical and spectrographic analyses of the mineral elements in fish and shellfish meals and kelp meals have been conducted at Johns Hopkins University. A plan of cooperative research in the laboratories of the South Carolina Food Research Commission at Charleston, S. C., has been initiated in which a study is being made of the mineral content of oysters with relation to the prevention and cure of nutritional anemia. Various other cooperative tests with Federal and State agricultural experiment stations have been provided to extend the nutritional studies of marine products to farm animals.

The number of nutritional studies relating to and depending on other phases of the bureau's technological investigations, together with demands for nutrition investigations from the industry, have compelled the bureau to establish its own nutrition laboratory. This has been done, and the investigations already under way are taxing the facilities of this laboratory.

The outstanding contribution, resulting from research in this field of technology, has been the demonstration of the richness of domestic fish oils in vitamins A and D. The quantities of the above-described American fish oils available at present are sufficient to take care of any present or increasing future needs. The increased utilization of these domestic fish oils for medicinal use and for animal feeding will add to the economic wealth of this country, benefiting both our agricultural and fishery industries, and will lessen our dependence on foreign sources of supply.

Recently considerable interest has been shown in fish flour—a product at the present time being prepared experimentally from the edible parts, including the backbone, of fish remaining from the filleting or packaged fish industry. This product is dried at a low temperature, under vacuum, and ground into a fine meal or flour. It has a pleasant taste, odor, and an attractive appearance. It can be made cheaply, as it comes from raw material which is now either a waste or is converted into fish meal for animal feeding. It may contain as high as 28 to 30 per cent of minerals, consisting largely of calcium and phosphorus. Laboratory investigations and baking tests, conducted by the cereal laboratory of the Bureau of Chemistry and Soils in cooperation with this bureau, have demonstrated that it is possible to incorporate 10 to 25 per cent of this fish flour in bakery products of a palatable and nutritious nature designed especially to appeal to children. Fish flour should be of considerable value in bone growth. Arrangements have been made with a public institution to make a special study of fish flour in the diet of children. Cooperation of the District of Columbia medical and dental societies has been extended to the bureau in connection with these tests.

GLOUCESTER LABORATORY

The bureau has established a large field laboratory at Gloucester, Mass., for the general conduct of technological research, including the following activities: Refrigeration, smoking, canning, bacteriology, by-products, and production methods. This laboratory has been equipped for both chemical and technological research and special equipment will be added from time to time as its research activities are expanded.

The first experimental projects to be started are: (1) Studies of improvements in methods of manufacture of fish flour and fish meal; (2) an investigation of the vitamin potency and chemical characteristics of haddock liver oil; (3) chemical studies of the refrigeration of fish; (4) methods for smoking fish; and (5) bacteriological studies aimed to improve fish products.

BIOLOGICAL FISHERY INVESTIGATIONS

The research activities of the scientific staff are addressed to the conservation of the Nation's aquatic food resources through encouraging and advising the States in their regulation of commercial and sport fishing, in perfecting methods of water farming and fish culture, and in providing the industries with sound and, in some cases, advance information as to the trend of the supply of commercial fishes. Major projects of research are conducted in each of the geographical interior and coastal sections of the United States.

Early in the fiscal year the division undertook an investigation of the haddock fishery—the most important fishery of the New England area. The fishery is subject to considerable fluctuations in yield; and recent evidences of decline in abundance, coupled with a tremendous expansion of the industry as a result of the packaged-fish business, have given rise to fears of serious depletion in the fishery. A comprehensive plan of investigation in the interest of conservation and the proper development of the resource, involving studies of changes in abundance of the stock and the possibilities of serious depletion, has been adopted, but such studies require considerable time for the production of results of practical value. Nevertheless, one phase of the investigation already has yielded results which promise to have signal value to the industry. A new type of savings trawl has been developed to permit the escape of virtually all fish below commercial size limits without reducing the catch of marketable fish. If this is adopted by the fishing industry, it should not only accomplish material economies in operation of the fishing vessels, but should be a positive factor in the conservation of the stock of fish in the sea.

Near the end of the fiscal year an agreement was reached with the California Division of Fish and Game for the conduct of a cooperative investigation of the trout and steelhead salmon situation in that State, and it is anticipated that the investigation will eventually include other Pacific coast areas. The streams of the western mountains have become so popular with anglers and vacationists that they are no longer able to withstand the strain of intensive fishing. New and improved methods of fish culture, of stocking, and of regulation must be devised and adopted to protect and augment the steelhead salmon runs and the trout supplies of these waters, and an investigation has been planned under the auspices of the two organizations uniting skill and material facilities on a large scale in the hope of meeting the situation.

FISHERY INVESTIGATIONS OF THE ATLANTIC AND GULF COASTS

Investigations of the changing abundance of the more important food fishes along the Atlantic coast and the causes of such changes with their implications as to remedial measures have proceeded with gratifying results. Fluctuations in the mackerel fishery continued to follow the principle of dominant year classes with a consistency that promises increased accuracy of predictions as more seasons are added to the experience upon which forecasts are based.

Much of the work at sea has been greatly handicapped through the lack of a fisheries research ship capable of operating trawls and performing related duties in connection with the various problems. The rectification of this condition is urgent.

Continuation of the investigation of the shore fisheries of southern New England and the Middle Atlantic States has confirmed the view that fluctuation in yield of several important species is due to natural causes largely. In the case of scup and butterfish, dominance of the fishery by occasional exceptionally large broods is largely responsible for variation in the yield. In the case of squeteague, the causes have been found to be more complex and are not yet completely understood.

Investigations were continued on the seasonal occurrence of pelagic marine fish eggs and young fish at the entrance of Chesapeake Bay. During 1930–31 records of the new winter trawl fishery, which has developed recently off the Virginia and North Carolina coasts, were secured. This fishery is of special interest, since it provides employment for a number of otherwise idle northern vessels, supplies an important fresh-fish market in the seasons of scarcity, and opens to exploitation the species of fish formerly caught only in the summer season. In upper Chesapeake Bay an investigation of the striped bass or rockfish has been undertaken to study the life history and habits of the fish as a basis for regulations, which appear to be badly needed for the protection of the supply.

To provide further fundamental information as to the lives and habits of the important food fishes of the South Atlantic coast, studies on the development of the young of the shore species were continued at the Fisheries Biological Laboratory, Beaufort, N. C., where special facilities for such studies are available. One report on this subject was recently issued and another dealing with several species is nearing completion. At this station also improvements in the methods of feeding young diamond-back terrapin have been developed.

Although of commercial importance for a half century, the shrimp has achieved a place among the important fisheries only within the past 10 or 15 years. The growth of this industry has been so rapid and has reached such magnitude that grave fears as to the permanency of the supply have been entertained by the industry, and the investigation started during the last half of the fiscal year gives every promise of providing the necessary information for the enaction of regulatory legislation should that be necessary to insure continued productivity of the resource.

A special study is being made in Georgia of the effects of the shrimp trawl upon the food and game fishes of the area.

FISHERIES OF INTERIOR LAKES

Investigations of the commercial fisheries of the Great Lakes were continued during the fiscal year 1931. Three different types of research were carried on in the Great Lakes, viz, a study of the effect upon the fish stock of commercial fishing gear and studies of experimental gear designed to prevent the destruction and waste of undersized fish; investigations of the life histories of important commercial fish of the Great Lakes; and limnological surveys in Lake Erie to study the conditions of the environment affecting fish production.

Studies of the trap-net fishery in Lake Erie were completed during the year and recommendations will be offered for an improved type of gear. Similar studies with gill nets were conducted in Green Bay, Lake Michigan, and in Lake Huron. In Lake Michigan a comprehensive program of experimental fishing with gill nets at numerous points typical of the entire lake has been continued, employing the fisheries motor ship *Fulmar*, in an effort to perfect fishing gear which will be effective for catching chubs without at the same time destroying a great number of immature lake trout. Experimental fishing-gear studies have contributed much information on the life histories of the important fishes taken, and such data accumulating as the field work progresses will be of material value in the drafting of fishery regulations by the various States.

Field studies on the international dispute concerning pike-perch fishing in Lake Champlain were completed during the fiscal year, and a report is in process of preparation.

In the Wisconsin lakes detailed studies of the rate of growth of various food and game fishes were made by the bureau's investigators in the hope of correlating these data with the great mass of limnological observations obtained by the Wisconsin Geological and Natural History Survey in a study of the factors affecting fish growth and reproduction.

FISHERIES OF THE PACIFIC COAST AND ALASKA

The results of fishery investigations in Alaska are utilized throughout the fishing season and from year to year in the formulation and in the prompt application of fishery regulations over the entire area in the interest of conservation. A knowledge of the routes of migration of the important salmon runs, enumeration of spawning fish passing weirs on their way to headwaters of streams for propagation, and the age composition of the various runs are essential to the bureau's program of regulation of the fisheries. During the fiscal year the third section of the report on the statistics of the Alaska salmon fishery was completed for publication. This report covers the statistics from earliest times to 1927 for the Prince William Sound and adjacent territory.

An important contribution to the knowledge of the biology of the Pacific herring was published during the year, and a second report on the fluctuations in the supply of herring in Prince William Sound has been prepared. The herring fishery has suffered depletion in restricted areas, and scientific information obtained from these studies has been of assistance in placing additional restrictions upon the fishery to prevent exhaustion in areas now productive.

During May, 1931, another regular biennial census of the razor-clam beds near Cordova, Alaska, was made to determine the state of the resource, in order that canning operations in that vicinity may be so regulated as to permit continued productivity of the beds.

In the United States, salmon investigations by the bureau have been restricted to the Columbia River. One new marking experiment dealing with land-locked salmon of that river was initiated during the spring of 1931, and the records of recovered fish resulting from previous marking experiments on other species were collected and analyzed.

FISH SCREEN AND FISH LADDER INVESTIGATIONS

The investigational work pertaining to the conservation of fish by means of screens and ladders has been continued without interruption. Field experiments with the electric screen have led to the adoption of simplified and improved apparatus. The highly satisfactory action of the electric screen in preventing upstream migrants from entering tail race waters was maintained during the past season. However, its effectiveness will never be 100 per cent, and there is a tendency on the part of the public to be apprehensive of the electric screen. On all new projects and wherever possible elsewhere the recommendation of the bureau is for the mechanical, revolving screen—a device which is unpatented and one which long use has proved to be entirely effective and reliable. The bureau continues to operate with success its electric screens in the Yakima country, where it is now impracticable to install mechanical screens. A development of the season's work was the discovery of the improvement that can be effected in leading migrating fish to by-pass channels by the use of lights. A survey has been made of fish-screen problems in Montana, and the bureau now has under construction a mechanical screen for the Jocko Canal and is preparing detailed plans and specifications for a mechanical screen (the largest ever constructed) on the Sun River Canal of the United States Reclamation Service.

In the fall of 1930 the bureau designed and constructed two concrete fish ladders on Government projects, these being located at Sprague River Dam in Oregon and at Wapato Dam in Washington. Both structures are similar in design to the successful ladder built by the bureau at Sunnyside Dam. During the winter the fish ladder requirements of the State of Maine were examined and reported on. In Idaho, special fishway problems received attention.

Considerable work has been done in connection with hydroelectric developments proposed or now under construction on streams supporting migratory fish. Applications for power licenses have been studied, field examinations made, and the proper fish-protective devices specified. Miscellaneous activities of the investigation have included engineering services in the preparation of designs for the water supply at the proposed new Butte Creek hatchery and for the new pumping equipment and distribution system at Clackamas hatchery.

AQUICULTURAL INVESTIGATIONS

Facilities for investigations in the interest of fish culture were materially increased during the fiscal year by improvements at the Fairport (Iowa) station, where pond facilities were nearly doubled. This station has become a prime factor in the bureau's fish-cultural activities, for the principles of black-bass culture which have been developed here are being generally adopted throughout the country at large wherever conditions are suitable. The output of fingerling bass which resulted as a by-product of the experimental work was of material aid in filling requests for fish for planting. Similar investigations to adapt the new principles to local conditions have been undertaken at several of the fish-cultural stations, and studies are being conducted in the Upper Mississippi Wild Life and Fish Refuge, where it has been demonstrated that the sloughs and ponds adjacent to the Mississippi River can be used to produce black bass in considerable quantities.

Trout-cultural investigations were continued at the Pittsford (Vt.) experimental hatchery where feeding experiments have been under way for several years. Additional foods have been tested, the most striking results being obtained from the use of dried salmon eggs. Commercial fish meals were also employed and superior rations have been devised at material savings in cost over foods generally used in hatcheries. Breeding experiments to develop brood stocks of superior quality, which were begun several years ago, have been continued, and experiments in stocking local waters with black-spotted trout and Montana graylings have been notably successful. At this hatchery the diseases of trout were also studied.

An investigation which promises to become of considerable importance has been undertaken on the diseases of the sea herring of the coast of Maine.

An important part of the bureau's pathological studies has been conducted in numerous hatcheries throughout the eastern section of the United States.

SHELLFISH INVESTIGATIONS

The bureau's investigations of shellfish, aside from the razor-clam census referred to in connection with Alaska fishery investigations, include two distinct and totally unrelated projects. One deals with the oyster fishery and the cultivation of oysters on the eastern and western coasts of the United States as well as the Gulf area, and the other deals with the fresh-water mussels of the Mississippi River and the attendant problems of pollution.

Oyster investigations were conducted during the fiscal year 1931 in Southern New England, Chesapeake Bay, in various South Atlantic States, and on the Pacific coast. A study of causes of mortality of oysters in the lower Chesapeake Bay was finished and a preliminary report issued. The results of this work, which began in May, 1930, and which was carried out in cooperation with the Fisheries Commission of Virginia, show that the mortality of oysters in 1929–30 was caused by the concurrence of a number of unfavorable factors, namely, low oxygen tension in the water during the fall and winter of 1929, planting oysters on soft bottoms, and overcrowded conditions in some of the planted areas. The report stresses the necessity of employment of better oyster-cultural methods, and outlines the general policy for the development and maintenance of public reefs in the State of Virginia.

The main difficulty in the South Atlantic States is the overcrowding of oysters by a new crop of seed oysters that set on the old ones. It is planned to develop a method of control of setting whereby the crowded conditions on the reefs can be overcome. In several localities substantial areas of oyster bottoms were set aside for experimental purposes.

In New York and Connecticut the work on the method of control of starfishes and other enemies of oysters has been continued.

Numerous experiments made with different toxic substances have shown that positive results could be expected only with various copper salts.

In cooperation with the State department of fisheries there has been established at Olympia, Wash., a laboratory adapted for research on problems of the oyster industry of Puget Sound. An investigation of the effect of pulp-mill wastes on oysters, which has been carried on since 1929, has been completed and the report is in press. Present investigations deal primarily with the methods of cultivation and the biology of the native oyster. An investigator also was stationed on the Oregon coast to study local problems and to assist in developing improved practices in oyster culture.

Investigations of fresh-water pearl mussels, which provide raw material for the great American button industry, were conducted from laboratory headquarters at the University of Missouri and at various places along the Mississippi River and its tributaries from a floating laboratory loaned by the United States Army engineers and later purchased from them. These investigations are primarily aimed at the perfection of new methods of mussel culture devised in previous years' studies to propagate fresh-water mussels by means independent from fishes of the locality, which in nature must serve as hosts during the parasitic stage of the development of mussel larvæ. Immediate adoption of this method of culture on a commercial scale is prevented by the existence of sufficient pollution from industrial and domestic sources in the entire upper Mississippi River and in many of its tributaries to kill the young mussels. Accordingly, a critical study of this pollution factor has also been undertaken.

Surveys of other river systems, including those of Texas flowing directly into the Gulf of Mexico, have resulted in discoveries of considerable areas of river bottoms suitable for the propagation of mussels. A further survey is being organized to study the Mississippi River conditions south of Keokuk Dam and along the Ohio and Tennessee Rivers. In the course of this expedition with the floating laboratory, quantities of mussel spawn will be propagated and planted as suitable water areas are encountered. Plans have also been made to establish a mussel-rearing station at the bureau's fish hatchery at Fort Worth, Tex., for the stocking of waters in that region.

The War Department's program calling for the construction of a score of dams and a 9-foot ship channel in the upper half of the river has aroused the fears and protests of fishermen and sportsmen throughout the region. At the request of the War Department, therefore, the bureau undertook a survey of the area involved in order to ascertain what would be the probable effects upon the fish and mussel fauna of the canal and water storage projects. A detailed limnological survey was completed early in the fiscal year and a preliminary report was presented to the War Department summarizing the findings. This report pointed out that if pollution and silting of the river were first corrected, the canalization project would not be harmful, and indeed might be beneficial to fish life in that area.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

The execution of the laws and regulations for the conservation of the fisheries of Alaska was continued in accordance with the policy adopted when the White law of June 6, 1924, gave the Secretary of Commerce broad powers with respect to control of the time, place, and method of commercial fishing. As salmon yield greater wealth than any other natural resource of Alaska, particular attention was given to conservation measures affecting this fishery. Extreme fluctuations characterized the salmon runs in the calendar year 1930, necessitating sharp curtailment of commercial fishing in some places in order that no cyclical recurrence of the shortage might be caused by lack of seeding of the spawning beds. The Commissioner of Fisheries was in Alaska for a number of weeks during the active salmon-fishing season, giving personal attention to various fishery problems.

Revised fisheries regulations were issued December 18, 1930, to be effective in 1931. These have since been modified by a number of supplementary orders, including the temporary closing during the 1931 season of certain areas in southeastern and central Alaska which will eliminate the operation of some 150 traps. The boundary of the Yukon-Kuskokwim area has been extended and additional waters in that area have been opened to limited commercial fishing for salmon.

Twelve statutory employees and 232 temporary stream guards and special workmen were identified with the patrol of the fishing grounds in the calendar year 1930, in addition to the crews of 15 bureau vessels and 10 chartered boats. Launches were used by many of the stream guards stationed at the mouths of salmon streams and in other closed areas to prevent illegal fishing. As in the previous season, a supplementary patrol by aircraft was maintained from time to time, chiefly in southeastern Alaska during the weekly closed periods.

Much was accomplished in the improvement of salmon streams by the removal of obstructions that hindered the ascent of salmon to the spawning grounds. The destruction of predatory species of fish that feed upon young salmon was actively carried on in the Bristol Bay region. Territorial assistance in providing funds for these purposes was of material advantage. At its 1931 session the legislature appropriated $25,000 for continuance of this work during the next two years.

ALASKA SALMON HATCHERIES

At the Government hatcheries at Afognak and on McDonald Lake 33,731,790 red-salmon eggs, 18,019,470 pink-salmon eggs, 100,000 chum-salmon eggs, and 123,904 steelhead-trout eggs were collected in the calendar year 1930. Shipments totaling 16,262,776 pink-salmon eggs and 3,055,000 red-salmon eggs in the eyed stage were forwarded to Seattle for distribution. At the privately owned hatchery operated under the provisions of the Alaska fisheries act of June 26, 1906, 21,190,000 red-salmon eggs were collected.

SPECIAL STUDIES AND INVESTIGATIONS

Life-history studies of the Pacific salmons were continued, dealing primarily with the red-salmon runs of Bristol Bay, Karluk, Chignik, and Copper River, and the pink-salmon runs in southeastern Alaska. To develop further information regarding migration routes approximately 3,500 salmon, chiefly pinks, were tagged and released from traps in the vicinity of Cape Fox and on the east coast of Prince of Wales Island. Weirs to count the escapement of spawning salmon were operated in 26 typical salmon streams, of which 9 were in southeastern, 13 in central, and 4 in western Alaska. Investigations concerning the Alaska herring were also continued.

PRODUCTS OF THE FISHERIES

Salmon products comprised about 70 per cent in quantity and 84 per cent in value of the total output of the Alaska fisheries in the calendar year 1930. Approximately 93 per cent of the salmon products consisted of canned salmon, the pack amounting to 5,032,326 cases, or 241,551,648 pounds, valued at $29,694,898. As compared with the pack of the preceding year, the output of canned salmon in 1930 showed a decline of 6 per cent in quantity and 27 per cent in value. The heavy loss in value was attributable partly to the generally lower level of prices and partly to the shortage of red salmon. An unusually large proportion of the Alaska pack was made up of pink salmon, the price of which fell to but one-third of that of red salmon.

The quantity of herring products exceeded that of the preceding year, the gain being reflected entirely in the output of the pickled product. Prices on this commodity, however, as well as of meal and oil, showed a considerable decline, and the total value of herring products was the lowest since 1923. The halibut industry also was severely affected by economic conditions; as a result of curtailment of operations and of poor fishing in some localities there was a reduction of approximately 16 per cent in the quantity landed by the Alaska fleet, while the value declined 32 per cent from that of the preceding year. The production of clams and shrimps increased in both quantity and value. Cod fishing from shore stations decreased considerably, while whaling and virtually all of the minor fisheries were conducted on about the same scale as in 1929.

The total yield of the Alaska fisheries in the calendar year 1930 amounted to 370,990,360 pounds of products, valued at $37,679,049, as compared with an average of 370,353,764 pounds, valued at $48,042,667, for the 5-year period from 1925 to 1929, inclusive. The value of the 1930 catch to the fishermen was approximately $12,285,000, or about $4,297,000 less than in the preceding year. There were 27,568 persons employed in the various branches of the industry, as compared with 29,283 in 1929.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

An outstanding example of international cooperation is shown in the splendid results achieved under the convention of 1911 for the protection and conservation of the North American fur-seal herd, which has its breeding grounds at the Pribilof Islands, Alaska. Since 1911 there has been a steady growth of the herd, numbering at that time about 125,000. There has also been a corresponding development of facilities for the expeditious conduct of the work at the Pribilof Islands.

Sealing operations in the season of 1930 included the taking and curing of sealskins and the marking and reserving of an adequate number of 3-year-old male seals for future breeding stock. For the first time there were no fall killings, as the plan has been adopted to preserve in cold storage such seal meat as may be required for food by the natives during the winter. Attention was given to the care of herds of blue foxes on St. Paul and St. George Islands and to the taking of fox skins.

Good progress was made during the year in the construction of new buildings, the erection of a dock at East Landing, and the extension of improved roads. The new by-products plant, which was begun in the spring of 1930, was completed; and equipment was installed in the season of 1931.

The service of the new tender *Penguin* was of very material advantage in the conduct of the bureau's work at the Pribilofs. A number of voyages were made to Seattle during the year, as well as frequent interisland trips and contacts with points along the Alaska Peninsula.

A staff of employees at the Pribilofs directed the work performed by resident natives and by temporary native workmen from the Aleutian Islands and the mainland who assisted with the work in the summer. The temporary labor is employed at a specified wage, but the Pribilof natives are virtual wards of the Government who are provided with the necessaries of life, including medical and educational aid, in return for their services. They receive cash payments also, at the rate of 75 cents for each sealskin and $5 for each fox skin taken, as well as some additional compensation for special services. At the close of the calendar year 1930 the native population of the Pribilof Islands numbered 375 persons.

The annual supplies for the Pribilof Islands were transported from Seattle, Wash., on the U. S. S. *Sirius*, through the cooperation of the Navy Department. The vessel carried a shipment of sealskins on the return voyage. Assistance was rendered also by the U. S. Coast Guard in patrolling waters frequented by the fur-seal herd.

SEAL HERD

Computations showed a total of 1,045,101 fur seals in the Pribilof Islands herd on August 10, 1930—an increase of 73,574 animals, or 7.57 per cent, over the corresponding figure for 1929.

TAKE OF SEALSKINS

In the calendar year 1930 there were taken on the Pribilof Islands 42,500 fur-seal skins, of which 34,382 were from St. Paul Island and 8,118 from St. George Island. This was an increase of 2,432 over the number taken in 1929.

MARKING RESERVED SEALS

In the calendar year 1930 there were marked and reserved for future breeding stock 6,539 three-year-old male seals, of which 4,918 were on St. Paul Island and 1,621 on St. George Island. Included in the reserve also were a large number of seals of this age class that were not taken up in the drives.

SALE OF SEALSKINS

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis, Mo., in the fiscal year 1931. On September 15, 1930, there were sold 11,675 black-dyed, 8,307 logwood brown-dyed, and 99 miscellaneous unhaired and raw-salted skins for a gross sum of $357,990.25. In addition 1 confiscated skin dressed in hair brought $1.75.

At the second sale, held on March 30, 1931, 11,503 black-dyed and 9,568 logwood brown-dyed skins were sold for $453,699.75. At the same time 137 black-dyed and 33 raw-salted Japanese fur-seal skins sold for $3,172. These 170 skins were the United States Government's share of sealskins taken by the Japanese Government in 1929. There were also sold 2 confiscated fur-seal skins, which brought $1.

Special sales of sealskins authorized by the Secretary of Commerce in the fiscal year 1931 consisted of 110 black-dyed, 188 logwood brown-dyed, 50 raw-salted, and 16 miscellaneous skins for display purposes, at a total of $10,068.74. All were taken at the Pribilof Islands.

FOXES

The management of blue-fox herds on St. Paul and St. George Islands as an adjunct to the fur-seal industry gives work to the natives in the winter when sealing activities are at a minimum and is the source of no little revenue to the Government from the sale of the pelts.

Seven hundred and forty-five blue and 32 white fox skins taken in the season of 1929–30 were sold at public auction in the fiscal year 1931. The blue pelts brought $26,743 and the whites $992, a total of $27,735.

In the season of 1930–31, 211 blue and 24 white fox skins were taken on St. Paul Island and 678 blue and 2 white skins on St. George Island, a total of 915 skins. Fifty foxes on St. Paul Island and 313 on St. George Island were trapped, marked, and released for breeding purposes. The breeding reserve includes also a considerable number of foxes that were not captured during the season.

FUR-SEAL SKINS TAKEN BY NATIVES

Pursuant to the provisions of the North Pacific Sealing Convention of July 7, 1911, Indians under the jurisdiction of the United States and Canada took 2,832 fur-seal skins which were duly authenticated by officials of the respective Governments. Of these skins, 85 were taken by natives of southeastern Alaska, 450 by natives of Washington, and 2,297 by natives of British Columbia. Through the courtesy of the Interior Department the superintendent of the Neah Bay Indian Agency authenticated the skins taken by Indians of the State of Washington.

FUR-SEAL PATROL

A patrol of the waters frequented by the Pribilof Islands fur-seal herd was maintained by vessels of the United States Coast Guard, supplemented in the spring by two of the bureau's fishery patrol vessels which traversed the waters in the vicinity of Cape Flattery and off the coast of southeast Alaska.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

No changes were made in the regulations previously issued for the protection of sea otters, walruses, and sea lions. The killing of sea otters is prohibited at all times. There is a closed season at all times on walruses and sea lions, although certain limited killing is permitted under specified conditions.

BLACK BASS LAW ENFORCEMENT

With the transfer of Talbott Denmead, formerly assistant United States conservation officer of the Biological Survey, from the Department of Agriculture to the Department of Commerce to fill the newly created position of law enforcement officer, the new black bass law enforcement division of the bureau was formally inaugurated. The appropriation for the fiscal year 1932 will permit the bureau to employ one more full-time inspector, and perhaps several part-time ones, which positions will be filled in the near future.

With this small force it was found necessary to create the cooperative position of deputy black bass law inspector, without salary, appointees to be generally limited to regularly employed State fish and game protectors. While fully realizing that unpaid deputies are not always satisfactory, it is felt that much can be accomplished in this manner at present that could not be done in any other way.

The law enforcement officer has visited and held important conferences with State game officials and others in Pennsylvania, Minnesota, Wisconsin, Illinois, and the New England States relative to the enforcement of the black bass law. Inspections of Baltimore fish markets have been made regularly.

As the Federal statute is predicated on an infraction of State law, it is essential that the various State laws relating to closed seasons, limits, sale, and transportation of black bass be made readily available to all interested, including Federal and State officials, commercial fishermen, fish dealers, and sportsmen. Bureau officials have been steadily engaged for several months in a study of the game fish laws of the 48 States, and rapid progress has been made. The largest part of this rather complicated task is completed, and it will shortly be possible to issue in printed form a synopsis of the State game fish laws, along with the Federal black bass law and other data.

Numerous reports of alleged infractions of the Federal black bass law have been received from Kentucky, Maryland, Virginia, Arkansas, Alabama, Mississippi, and other States, but investigations in most instances disclosed no violations of the Federal statute. In several cases it was found that fish other than black bass were involved, and in others violation of State law could not be proved.

An excellent spirit of cooperation was received from the State fish and game departments, anglers, and others, and it is believed the law will be reasonably observed after it receives publicity and its provisions are fully understood. With this end in view numerous articles have been carefully prepared and published in fish and game magazines, the press, and other publications, covering the main features of the law, its aims and objects; addresses and radio talks by members of the bureau and others have explained the law, and about 2,000 copies have been distributed. The general correspondence resulting from this publicity has been large and covers many subjects relating to game fish, and the bureau has received many requests for advice and assistance in matters pertaining to game fish.

An excellent start has been made on the work in the three months since the inauguration of the division, and it enters the fiscal year of 1932 better prepared to carry out the provisions of the law.

VESSEL NOTES

The *Albatross II* was engaged throughout the year in scientific research work between Cape Sable, Nova Scotia, and Cape Hatteras, N. C., between the shore line and continental shelf. Oceanographic stations numbering 286 were made. Numerous 30 and 60 foot otter-trawl hauls were made. During the investigations there were tagged 352 cod, 280 haddock, 33 pollock, and flukes, sea bass, scup, butterfish, and croakers numbering 248 in all. At convenient times, between cruises, the vessel underwent various repairs at the Boston Navy Yard. The work was under the direction of O. E. Sette.

The steamer *Shearwater* was engaged in fish-cultural work at the Put in Bay (Ohio) station during the fall and spring months.

The steamer *Phalarope* was engaged as usual as a tender at the Woods Hole biological station.

The *Pelican* which was launched at Newport News, Va., last June is now at the Boothbay Harbor (Me.) station. It has been engaged throughout the year in fish-cultural activities.

The bureau's vessel *Fulmar*, a motor ship 102 feet long stationed at Charlevoix, Mich., was assigned to investigative duty with the Great Lakes scientific staff and has been fully equipped for experimental fishing. The vessel has been engaged in experimental work on Lake Michigan for the purpose of studying means of preventing the destruction of undersized and immature fish by commercial nets. Extensive biological data upon the life histories of these fishes and on problems of their conservation were obtained. The investigations continued from June to November, 1930, and were resumed again in May, 1931. Experimental fishing stations were occupied weekly throughout the season at numerous points distributed around the margin of the lake.

Sixteen vessels of the Alaska service cruised more than 140,000 nautical miles in the fiscal year 1931, as compared with 118,570 nautical miles in the previous year. The *Penguin* covered approximately 24,000 miles; the *Crane*, 15,000 miles; and the *Brant* and *Teal* each about 13,000 miles.

The *Penguin*, newest and largest of the bureau's Alaska vessels, was used chiefly as tender for the Pribilof Islands, although some incidental service was rendered the salmon-fishery investigations for two weeks in September. This vessel has proved a highly satisfactory addition to the Alaska fleet.

In southeastern Alaska the *Widgeon*, *Murre*, *Auklet*, and *Petrel* were engaged in fishery protective work throughout the season. Other vessels employed in that district for a time in the fall after the close of fishing operations to the westward were as follows: *Crane*, which had been on duty in the Alaska Peninsula region and had transferred seasonal employees to and from Bristol Bay; *Teal*, which patrolled waters of the Cook Inlet area during the summer; *Scoter*, engaged on Bristol Bay; *Blue Wing*, employed at Kodiak and Afognak Islands; and *Kittiwake*, which was in the Seward-Katalla district until September 10. The *Eider* and *Red Wing* were stationed in the Kodiak-Afognak district; the *Ibis* at Chignik; the *Merganser* in the Ikatan-Shumagin district; and the *Coot* on the Yukon River. The *Brant* was used in general supervisory work and made one cruise to the westward as far as Ikatan.

In addition to operations in connection with the fisheries in Alaska, the *Brant* was engaged for several weeks in patrolling waters of Neah Bay, Wash., and vicinity to enforce the laws for the protection of the fur-seal herd during its migration northward. The *Widgeon* performed similar duty off the coast of southeastern Alaska.

Nearly all of the Alaska vessels were given a general overhauling during the winter, either at Seattle or at one of the Alaska ports. The *Blue Wing* was extensively remodeled and was equipped with the 50-horsepower gas engine formerly in the *Scoter*.

APPROPRIATIONS

Appropriations for the bureau for the fiscal year aggregated $2,631,885, as follows:

Salaries	$860, 310
Miscellaneous expenses:	
Administration	4, 400
Propagation of food fishes	574, 000
Maintenance of vessels	169, 500
Inquiry respecting food fishes	172, 000
Fishery industries	87, 000
Sponge fisheries	3, 100
Construction of stations	265, 000
Enforcement of black bass law	6, 075
Protecting seal and salmon fisheries of Alaska	376, 500
Upper Mississippi Wild Life and Fish Refuge	25, 000
For improvements at the Fairport (Iowa) Biological Station	24, 000
By-products plant, Alaska	65, 000
	2, 631, 885

Very truly yours,

Henry O'Malley,
Commissioner of Fisheries.

ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1930 [1]

By Ward T. Bower, *Chief, Division of Alaska fisheries.*

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[1] Appendix I to the Report of the U. S. Commissioner of Fisheries for 1931. Approved for publication May 22, 1931.

INTRODUCTION

The conservation of the fisheries resources and the protection and utilization of the Pribilof Islands fur-seal herd comprise the two main divisions of the bureau's activities in Alaska.

For the maintenance of the fisheries on an undiminished scale it is essential that an adequate number of spawning fish be permitted to escape capture each season. To this end, restrictions are placed on commercial operations, some of which are of general application, while others are adapted to the needs in particular localities.

In the summer of 1930 the Commissioner of Fisheries made an extended cruise over the Territory to observe conditions in all the principal fishing districts. From time to time during the season modifications were made in existing regulations to meet unforeseen developments, and toward the end of the year a revised set of regulations was issued for the following season.

A patrol of all the important fishing grounds was maintained to insure compliance with the law and regulations. Fifteen vessels belonging to the bureau, 10 chartered boats, a considerable number of launches, and upward of 200 temporary employees were engaged in this work. In addition, some use was made of aircraft for brief periods, as in the previous year. Further attention was given to the removal of barriers that hindered the passage of salmon upstream, and a general survey of conditions on the spawning beds was made at the close of the season. The bureau cooperated with the Federal Power Commission in connection with applications for licenses for power projects, and with the Bureau of the Census in taking the decennial census in Alaska.

Scientific studies of the salmon, herring, and other aquatic resources were continued. Weirs were operated in 26 typical streams in various parts of Alaska to count the escapement of spawning salmon. The data thus obtained are of value in establishing the ratio of escape to catch and in determining the probable return from a known escapement. Reports of commercial operations were collected, and the data compiled therefrom are published herewith.

At the Pribilof Islands 42,500 fur-seal skins were taken, an increase of 2,432 over the take for 1929. A computation as of August 10, 1930, showed a total of 1,045,101 animals in the herd, a gain of 73,574 over the corresponding figures for the preceding year. The care of fox herds on the islands was given attention during the winter months, and in the season of 1930–31 there were taken 889 blue and 26 white fox pelts. Valuable service was rendered by the United States Coast Guard in maintaining a patrol of the waters frequented by the Pribilof Islands fur seals.

The administration of the fur-seal work was greatly facilitated by the commissioning in May of the bureau's sturdy new 130-foot power vessel *Penguin* to replace the *Eider* as tender for the Pribilof Islands. Work progressed satisfactorily at the islands on the construction of new buildings for natives and for use in connection with the fur-seal activities, including an addition to the by-products plant. Some extension of improved roads was made, and a new dock was begun at East Landing on St. Paul Island.

Through courtesy of the Navy Department, the U. S. S. *Sirius* transported the annual shipment of supplies from Seattle to the Pribilof Islands.

Two public auction sales of fur-seal skins were held during the year by the department's selling agents at St. Louis. At one of these fox skins were sold also.

Acknowledgment is made of the assistance rendered by members of the bureau's staff in the compilation and preparation of this report.

VISIT OF THE COMMISSIONER OF FISHERIES TO ALASKA

The Commissioner of Fisheries was in Alaska for several weeks during the active salmon-fishing season to observe the general condition of the fisheries. This direct contact with the industry makes possible more immediate modifications of the regulations, as may be necessary because of developments of importance during the fishing season.

Commissioner O'Malley left Seattle on the *Brant* on July 3 and made brief visits at Ketchikan, Wrangell, and Juneau in southeast Alaska before proceeding westward. Seward was reached on July 13, where he transferred to the *Teal* for passage to Iliamna Bay, whence the journey was continued over the portage to Bristol Bay. The commissioner sailed from Naknek on the *Crane* on July 17 for the south side of Alaska Peninsula, where on July 20 at Kabuch Point he again boarded the *Brant* to return to southeast Alaska, stopping en route at Squaw Harbor, Karluk, Afognak hatchery, Kodiak, Sawmill Bay, Nellie Juan, Valdez, and Cordova. Sitka was reached on July 28, and approximately three weeks thereafter were spent cruising in the southeastern district.

Following his departure from Alaska, Commissioner O'Malley gave attention to various fishery matters on the Pacific coast, including official hearings regarding the proposed treaty for the preservation of sockeye salmon in the Fraser River system, and returned to Washington on September 10.

EXECUTIVE ORDER ESTABLISHING AN ALASKA COMMISSION

Under date of January 10, 1930, an Executive order was issued forming a commission to work out a plan for the administration of Government business in the Territory of Alaska. The text of the order is as follows:

> Pursuant to the provisions of the act of February 10, 1927, entitled "An act authorizing the designation of an *ex officio* commissioner for Alaska for each of the executive departments of the United States, and for other purposes," and for the more economical and effective conduct of business in the Territory, it is hereby ordered that the commissioners who represent the Departments of Interior, Agriculture, and Commerce be formed into a commission, under the chairmanship of the *ex officio* commissioner for Alaska for the Department of the Interior, and that a plan of administration be worked out so that functions of these departments may be exercised in Alaska through the commissioner representing the department acting also as a member of the commission with the governor.
>
> The commission shall study and recommend to the President, forwarding copies of its report to each of the appropriate Secretaries, affairs which should be transferred to Alaska for administration; and the commission will secondly recommend what personnel and records are necessary and advisable to be transferred to Alaska in connection with these administrative acts.

The matter has been receiving appropriate consideration in regard to any modifications in administrative procedure that may be deemed advisable.

THE McNARY-MAPES SUBSTANDARD FOOD AMENDMENT

The McNary-Mapes amendment to the United States food and drug act, approved July 8, 1930, and commonly referred to as the "substandard law" authorizes the Secretary of Agriculture to establish standards for the different classes of canned foods, except meat and milk, and to prescribe the form of statement that must appear in a plain and conspicuous manner on the labels of canned food falling below the established standard. It has been emphasized that this amendment does not legalize adulteration or misbranding, but merely allows wholesome edible products of substandard quality to be labeled and sold as such.

The application of this law to the salmon-packing industry is now receiving consideration, and it is anticipated that in due time regulations upon the subject will be promulgated by the Secretary of Agriculture.

REGULATIONS FOR PROTECTION OF WALRUSES AND SEA LIONS

A revised edition (fifth) of departmental Circular No. 286, containing the laws and regulations for the protection of the walruses and sea lions of Alaska, was issued by the Acting Secretary of Commerce under date of May 1, 1930. The regulations governing the killing of walruses and sea lions are as follows:

WALRUSES

The killing of walruses in the Territory of Alaska or in any of the waters of Alaska over which the United States has jurisdiction is prohibited from May 1, 1930, to April 30, 1932, both dates inclusive. This prohibition shall not apply to the killing of walruses by natives for food or clothing, by miners or explorers when in need of food, or to the collection of specimens for scientific purposes under permits issued by the Secretary of Commerce.

SEA LIONS

The killing of sea lions in the Territory of Alaska or in any of the waters of Alaska over which the United States has jurisdiction is prohibited from May 1, 1930, to April 30, 1932, both dates inclusive. This prohibition shall not apply to the killing of sea lions by natives for food or clothing, by miners or explorers when in need of food, by anyone in the necessary protection of property or while such animals are actually engaged in the devastation of runs of salmon, or to the collection of specimens for scientific purposes under permits issued by the Secretary of Commerce.

The penalties and forfeitures imposed by law will be strictly enforced against all persons who commit acts in violation thereof or of the regulations promulgated in accordance therewith.

FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects that were the objects of special investigation or inquiry.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued December 19, 1929, were amended by the following regulations issued by the Acting Secretary of Commerce under the dates indicated:

[*February 27, 1930*]

KODIAK AREA

Salmon fishery.—Regulation No. 4 is amended to read as follows: No set or anchored gill net shall exceed 300 yards in length, and each shall be set in substantially a straight line: *Provided*, That not to exceed 20 yards of each net may be used as a hook. Only one such hook is permitted on a net. There shall be a distance interval of at least 200 yards both endwise and laterally at all times between all set or anchored gill nets operated. No wire net or other device that impedes or obstructs the free passage of fish shall be used in connection with the operation of any set or anchored gill net except that seine webbing may be used on the shore end between the lines of high and low water.

Regulation No. 18 (*f*) is amended to read as follows: Uyak Bay: All waters of the bay south of 57 degrees 19 minutes north latitude.

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—Regulation No. 16 (*b*) is amended to read as follows: Inian Islands: (1) North of 58 degrees 15 minutes 42 seconds north latitude, exclusive of the east end of the northeastern island; and (2) southwest coast of the northwestern island between 58 degrees 15 minutes 42 seconds north latitude and 58 degrees 15 minutes 18 seconds north latitude.

EASTERN DISTRICT

Salmon fishery.—Regulation No. 17 (*k*) is amended to read as follows: Kupreanof Island: Northwest coast (*a*) from a point ½ statute mile southeast of the outer extremity of Point Macartney northward to a point at 57 degrees 1 minute 40 seconds north latitude and 134 degrees 1 minute west longitude; and (*b*) from a point at 57 degrees 3 minutes 15 seconds north latitude and 134 degrees 1 minute 15 seconds west longitude to a point on the north shore at 57 degrees 5 minutes 50 seconds north latitude and 133 degrees 54 minutes 20 seconds west longitude, excluding coast between 133 degrees 56 minutes 45 seconds west longitude and 133 degrees 59 minutes west longitude (as shown on U. S. Coast and Geodetic Survey Chart No. 8200).

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation No. 17 (*f*) is amended to read as follows: St. Philip Island: Within 2,500 feet of the western extremity of the island.

Regulation No. 17 (*bb*), permitting traps on the west coast of Zarembo Island from point St. John to 56 degrees 24 minutes 20 seconds north latitude, is revoked.

Regulation No. 17 (*cc*), permitting traps on the west coast of Zarembo Island from 56 degrees 20 minutes north latitude southeasterly to a point on the coast at 133 degrees west longitude, is revoked.

[*April 21, 1930*]

YUKON-KUSKOKWIM AREA

Salmon fishery.—1. Commercial fishing for salmon is prohibited except in Kuskokwim Bay, exclusive of Goodnews Bay, between 59 degrees north latitude and 59 degrees 40 minutes north latitude westward to Cape Avinof.

2. Commercial fishing for salmon shall be conducted solely by drift gill nets, set nets, and purse seines.

3. The total aggregate length of gill nets on any salmon fishing boat, or in use by such boat, shall not exceed 150 fathoms hung measure.

4. King-salmon gill nets shall have a mesh of at least 8½ inches stretched measure between knots, and red-salmon gill nets shall have a mesh of at least 5½ inches stretched measure between knots as measured when actually in use. No red-salmon gill net shall be over 28 meshes deep.

5. Commercial fishing for salmon is prohibited except in the period from 6 o'clock antemeridian June 5 to 6 o'clock postmeridian July 31 in each year.

6. The combined take of king and red salmon for commercial purposes shall not exceed 250,000 fish in any calendar year.

7. Each gill net in operation shall be marked by a cluster of floats or corks at the ends, and double floats or corks shall be attached to the cork line at 25-fathom intervals. The clusters of floats or corks at the ends and the double floats or corks at the 25-fathom intervals shall be painted bright red. The clusters at the ends shall also be legibly and plainly marked with the initials of the operator. In addition, metal markers bearing the initials of the operator shall be attached to the ends of each gill-net cork line and at 25-fathom intervals along the cork line.

8. The trailing of web behind any fishing boat is prohibited above the markers fixing closed waters.

9. The use of motor-propelled fishing boats in catching salmon with gill nets is prohibited.

Herring fishery.—Regulation No. 2 is amended to read as follows: Commercial fishing for herring in the waters of Golofnin Bay, within a line from the southern extremity of Rocky Point to the southern extremity of Cape Darby, shall be conducted solely by gill nets of mesh not less than 2¾ inches stretched measure between knots.

ALASKA PENINSULA AREA

Salmon fishery.—Regulation No. 1 is amended to read as follows: In the waters of Nelson Lagoon, and thence along the coast to Cape Seniavin, including Nelson Lagoon, Herendeen Bay, Port Moller, and the fishing grounds off the Bear, Sandy, and Ocean Rivers, the 36-hour closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the periods from 6 o'clock postmeridian until 6 o'clock antemeridian of each night from Monday to Friday, inclusive, making a weekly closed period in these waters of 96 hours, which shall be effective throughout the entire salmon fishing season of each year.

COOK INLET AREA

Salmon fishery.—Regulation No. 13 (*j*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet (1) from a point north of Boulder Point at 60 degrees 46 minutes 18 seconds north latitude, 151 degrees 15 minutes 40 seconds west longitude, southerly to a point at 60 degrees 44 minutes 1 second north latitude, 151 degrees 19 minutes 58 seconds west longitude; (2) from a point at 60 degrees 43 minutes 44 seconds north latitude, 151 degrees 22 minutes 12 seconds west longitude, southerly to a point at 60 degrees 19 minutes 39 seconds north latitude, 151 degrees 23 minutes 24 seconds west longitude, exclusive of 2½ statute miles each side of the mouth of Kenai River, 2½ statute miles each side of the mouth of Kasilof River, and 1 statute mile each side of the mouths of all other salmon streams; and (3) from a point at 60 degrees 18 minutes 48 seconds north latitude, 151 degrees 23 minutes 20 seconds west longitude, southerly to a point 2 statute miles northward from the mouth of Anchor Point River, exclusive of 2 statute miles each side of the mouth of Ninilchik River, 2 statute miles each side of the mouth of Deep Creek, 1 statute mile each side of the mouths of all other salmon streams and exclusive of the coast within 6,000 feet of a point at 59 degrees 57 minutes 50 seconds north latitude, 151 degrees 44 minutes 17 seconds west longitude.

SOUTHEASTERN ALASKA AREA

WESTERN DISTRICT

Salmon fishery.—Regulation No. 19 (*e*) is hereby amended to read as follows: Baranof Island: From a point ½ statute mile south of Point Thatcher to Point Lull, exclusive of the coast between 57 degrees 22 minutes 30 seconds north latitude and 57 degrees 23 minutes 30 seconds north latitude.

[*May 14, 1930*]

SOUTHEASTERN ALASKA AREA

EASTERN DISTRICT

Salmon fishery.—Regulation No. 17 (*f*) is amended to read as follows: Mainland, Frederick Sound: From a point on the south side of Fanshaw Bay at 133 degrees 32 minutes 30 seconds west longitude to Cape Fanshaw, thence southeasterly to 133 degrees 21 minutes west longitude, excluding coast between 133 degrees 22 minutes west longitude and 133 degrees 26 minutes west longitude.

GENERAL REGULATIONS EFFECTIVE IN ALL AREAS

Salmon fishery.—1. No gill net shall include any webbing other than a single sheet hung between cork and lead lines.

2. The use of any trammel net, diver net, or so-called combination net is prohibited.

3. No gill net shall be used in any form of seining operations.

[*May 27, 1930*]

YUKON-KUSKOKWIM AREA

Salmon fishery.—Commercial fishing for salmon by means of gill nets is permitted in the waters of Kuskokwim Bay from 59 degrees 40 minutes north latitude northward to a line 500 yards outside the mouth of the Kuskokwim River. The mouth of the Kuskokwim River shall be considered as at a straight line extending from a marker erected for the purpose at Beacon Point to another marker at Popokamute.

SOUTHEASTERN ALASKA AREA

YAKUTAT DISTRICT

Salmon fishery.—Regulation No. 16 is amended to read as follows: The 36-hour closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian of Friday of each week until 6 o'clock antemeridian of the Monday following, making a weekly closed period of 60 hours: *Provided*, That in the waters of Dry Bay the weekly closed period shall extend from 6 o'clock postmeridian of Friday of each week until 6 o'clock postmeridian of the Wednesday following, making a weekly closed period of 120 hours in the waters of Dry Bay.

[*June 20, 1930*]

BRISTOL BAY AREA

Salmon fishery.—In the Nushagak district, which embraces the waters of Nushagak Bay within a line form Point Protection to Etolin Point, the 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian of Friday of each week to 6 o'clock antemeridian of the Monday following, making a weekly closed period of 60 hours.

[*June 27, 1930*]

ALASKA PENINSULA AREA

Salmon fishery.—Regulation No. 20 (*n*) is amended to read as follows: Unga Island: East coast (1) from a point at 55 degrees 13 minutes 43 seconds north latitude, 160 degrees 31 minutes west longitude, easterly and southerly to a point at 55 degrees 13 minutes 15 seconds north latitude, 160 degrees 29 minutes 42 seconds west longitude, and (2) from a point at 55 degrees 12 minutes 10 seconds north latitude, 160 degrees 29 minutes 42 seconds west longitude, southerly and easterly to a point at 55 degrees 11 minutes 30 seconds north latitude, 160 degrees 27 minutes 30 seconds west longitude.

[*July 3, 1930*]

ALASKA PENINSULA AREA

Salmon fishery.—No trolling boat shall operate more than four trolling lines. In commercial trolling operations no king salmon shall be caught which when dressed will weigh less than 6 pounds. In the event any such undersized salmon are thus taken, they must be carefully removed from the hook without jerking or other action causing injury and returned to the water alive.

COOK INLET AREA

Salmon fishery.—All commercial fishing for salmon is prohibited in Kamishak Bay and its tributary waters west of 154 degrees west longitude.

[*July 17, 1930*]

BRISTOL BAY AREA

Salmon fishery.—Commercial fishing for salmon in all districts is prohibited after 12.00 o'clock midnight July 17 throughout the remainder of the year.

[*July 24, 1930*]

KODIAK AREA

Salmon fishery.—Regulation No. 18 (*c*) is amended so as to permit commercial fishing for salmon by beach seines only between Cape Karluk and Cape Grant.

[*July 29, 1930*]

BRISTOL BAY AREA

Salmon fishery.—Regulation No. 10, as amended by supplementary regulation No. 251–16–8, dated July 17, 1930, is hereby further amended so as to permit commercial fishing for salmon from 6 o'clock antemeridian August 6 throughout the remainder of the year.

KODIAK AREA

Salmon fishery.—All commercial fishing for salmon in the Kodiak Area is prohibited from 6 o'clock postmeridian August 2 to 6 o'clock antemeridian September 1: *Provided*, That this prohibition shall not apply (*a*) to beach seines between Cape Karluk and Cape Uyak, and (*b*) to traps on the north shore of the entrance to Moser Bay within 1 statute mile outside Bun Point.

[*July 31, 1930*]

KODIAK AREA

Salmon fishery.—Supplementary regulation No. 251–16–10, dated July 29, 1930, is amended so as to permit commercial trap fishing from 6 o'clock antemeridian August 4 to 6 o'clock postmeridian August 30 at Afognak Island from a point on the north side of Raspberry Strait at 58 degrees 8 minutes 45 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude, north to a point at 58 degrees 9 minutes 30 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude.

[*August 6, 1930*]

ALASKA PENINSULA AREA

Salmon fishery.—Regulation No. 2 is hereby amended to read as follows: In the waters along the south side of Alaska Peninsula from Cape Tolstoi to the outer extremity of Kupreanof Point, including the waters of the Shumagin and other adjacent islands, the 36-hour closed period for salmon fishing prescribed by Section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock antemeridian of Thursday of each week until 6 o'clock antemeridian of the Monday following, making a weekly closed period of 96 hours.

[*August 11, 1930*]

PRINCE WILLIAM SOUND AREA

Salmon fishery.—Regulation No. 8 is amended so as to permit commercial fishing for salmon by trolling only from 6 o'clock antemeridian August 11 to 6 o'clock postmeridian September 22 in the waters of Prince William Sound east of 147 degrees west longitude exclusive of (*a*) all waters of Valdez Arm north of Point Freemantle and (*b*) all waters closed to commercial fishing for salmon throughout the year.

[*August 22, 1930*]

CHIGNIK AREA

Salmon fishery.—All commercial fishing for salmon is prohibited throughout the remainder of the year after 6 o'clock postmeridian August 22.

KODIAK AREA

Salmon fishery.—1. All commercial fishing for salmon is prohibited throughout the remainder of the year after 6 o'clock postmeridian August 22 (*a*) in all waters of Alitak Bay within a line from Cape Trinity to Cape Alitak, and (*b*) in Karluk waters, extending from Cape Karluk to Cape Uyak.

2. Commercial fishing for salmon by means of any trap is prohibited for the remainder of the year after 6 o'clock postmeridian August 22 along Afognak Island from a point on the north side of Raspberry Strait at 58 degrees 8 minutes 45 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude, north to a point at 58 degrees 9 minutes 30 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude.

[*September 11, 1930*]

SOUTHEASTERN ALASKA AREA

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Commercial fishing for salmon is permitted in the waters of Klawak Inlet from Craig northward to Cemetery Point during the period from September 11 to September 25, both dates inclusive.

[*September 27, 1930*]

SOUTHEASTERN ALASKA AREA

Herring fishery.—The restrictions on herring fishing imposed by Regulations Nos. 2 and 3 shall not apply to the period from October 1 to October 4, both dates inclusive.

Revised regulations covering the fisheries of Alaska were issued by the Secretary of Commerce under date of December 18, 1930, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D. C.

ANNETTE ISLAND FISHERY RESERVE

The Annette Island Packing Co. again operated in the Annette Island Fishery Reserve under its lease from the Department of the Interior.

In 1930 the company operated eight traps within the reservation, the catch of which totaled 795,538 salmon; and 7,609 salmon taken in purse seines and gill nets within the reserve were purchased from natives. In addition, 113,118 salmon taken outside the reserve and purchased from natives and other independent operators of seines, gill nets, and traps were packed at the cannery. In the operation of the plant and the fish traps, employment was given to 230 persons, of whom 20 were whites, 196 natives, 13 Filipinos, and 1 Korean.

ALASKA FISHERY INTELLIGENCE SERVICE

For a number of years the bureau telegraphed Ketchikan fish prices to various leading ports in Alaska. This service, which was of value to the fishermen and buyers alike, has been supplanted by the broadcasting each day through the Ketchikan radio station (KGBU) of prices of salmon and halibut. Practically all fishing boats operated in Alaskan waters have radio receiving sets and are thus kept in close touch with market conditions.

STREAM IMPROVEMENT

Continuing the work undertaken in recent years and in accordance with plans outlined the preceding season, an intensive program of stream-improvement work was carried out in 1930, particularly in the spring, payment therefor being taken care of in part by funds appropriated by the Territorial Legislature at its 1929 session.

Log jams and other obstructions that hindered the ascent of salmon to the spawning grounds were removed from 74 streams in southeastern Alaska during the year. In this district also a fishway of reinforced concrete was constructed at Ketchikan Creek Falls. A temporary wing dam was made at the head of the falls to increase the flow of water sufficiently to fill all of the ladder compartments. This dam served its purpose during the steelhead run but was washed out by an unprecedented rise of water late in June. About the middle of August, when the pink-salmon run was under way, it again became necessary to build a dam, as the water in the creek was extremely low. A structure 2 feet high was built of timbers and heavy planking, banked with sand and gravel on the upstream side, and as soon as it was completed the salmon began to ascend in large numbers, sometimes as many as 100 fish being in the compartments at one time. Even the weaker fish were able to ascend the stream with ease, and none was battered to death on the rocks, as was the case formerly.

Accomplishments in central Alaska included the blasting of a zigzag channel through a portion of the stream bed between the two lakes tributary to Kaflia Bay, making the stream follow one channel, which greatly assisted the ascent of salmon during low water. A creek tributary to Halferty Bay was cleared of bowlders. In the Cook Inlet region considerable progress was made in clearing important red-salmon streams and lakes along the watershed of the Susitna and Little Susitna Rivers and streams emptying into Knik Arm. At the falls in McNeil Creek a temporary fish ladder about 30 feet in length was installed, with wing dams made of sacks filled with moss and gravel to confine the water above the ladder, which greatly facilitated the ascent of spawning salmon. Other stream improvements were effected in various districts by bureau employees in connection with their regular patrol duties and when checking up escapements in the fall.

STREAM MARKING

The maintenance of markers to define the mouth of each salmon stream and the limits of other waters closed to commercial fishing was given the usual systematic attention, particularly during the spring, when certain vessels of the bureau were assigned to this work.

Markers that had been defaced or removed were replaced, and new ones were erected and the locations of others moved in accordance with changes made in the regulations respecting closed areas.

STREAM GUARDS

The bureau employed 232 men as stream guards and special workmen in connection with law-enforcement duties in 1930. Of these, 108 were stationed in southeastern Alaska, 82 in central and 42 in western Alaska. Some of the temporary workers were engaged for only a few days, but the period of employment of the stream guards generally ranged from two to five months.

In southeastern Alaska 51 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 18 guards were stationed in the Seward-Katalla district, 10 on Cook Inlet, 36 in the Kodiak-Afognak district, 4 at Chignik, and 14 in the Alaska Peninsula district. Twelve of these guards, most of whom were in the Seward-Katalla district, provided their own launches.

In western Alaska 38 were on Bristol Bay and 4, of whom 1 furnished his own launch, were in the Yukon-Kuskokwim district.

There were also 8 special employees engaged in scientific work—2 on herring and 6 on salmon investigations, this work being carried on mainly in southeastern and central Alaska.

In addition, there were 12 statutory employees, 50 men on bureau vessels, and 15 on chartered boats.

The foregoing makes a grand total of 317 persons identified with fishery-protective work in Alaska in 1930, as compared with 298 in 1929.

VESSEL PATROL

Fifteen vessels owned by the bureau were operated in fishery-patrol work in Alaska in 1930. Of these, the *Widgeon*, *Murre*, *Auklet*, and *Petrel* were in southeastern Alaska throughout the season; the *Eider* and *Red Wing* at Kodiak and Afognak Islands; the *Ibis* at Chignik; the *Merganser* in the Ikatan-Shumagin region; and the *Coot* on the Yukon River. The *Brant* was used in general supervisory work, principally in southeastern Alaska, whence one trip was made to Ikatan and intermediate points in July. Vessels used in southeastern Alaska for a number of weeks in the fall after their return from duty to the westward were the *Scoter*, which had been in the Bristol Bay district until the latter part of August; the *Crane*, which transported employees and supplies from Seattle to Naknek in the spring and then patrolled the Alaska Peninsula region, making one cruise also to the Chignik area; the *Teal*, which was on Cook Inlet during the salmon-fishing season there; the *Kittiwake*, which patrolled the Seward-Katalla district until September 10; and the *Blue Wing*, which was engaged in fisheries patrol duty in the Kodiak-Afognak district and as tender for the Afognak hatchery until after the middle of August.

In addition to the above, the Pribilof Islands tender *Penguin* participated in the fisheries conservation work in southeastern Alaska during part of September, when it was used in the gathering of data on the salmon escapement in the Ketchikan region.

The following chartered boats were used in fisheries patrol: *Valkyrie*, *Helen Hinton*, *Helen F*, *Lady Luck*, and *Bear* in southeastern Alaska; *Stanley*, *Pilot*, and *Prospector* on Copper River and Prince William Sound; *Coyote* on Cook Inlet; and *Auk* in the Port Moller district.

In connection with the regular patrol of the Yukon-Kuskokwim district, transportation was afforded Dr. Aleš Hrdlička, curator of the division of physical anthropology of the Smithsonian Institution, Washington, D. C., who was a passenger on the *Coot* on its trip down the Yukon from Nenana as far as the head of Portage Slough from May 19 to May 31, and thereafter on the launch *Marie S* on the Kuskokwim River. Doctor Hrdlička remained in the district until the middle of July, making investigations at old native villages between Stony River and the mouth of the Kuskokwim in connection with his anthropological studies.

AERIAL PATROL

As in the previous year, seaplanes were chartered from a commercial company in 1930 and used at intervals, chiefly in southeastern Alaska, to supplement the regular patrol of the fishing grounds by vessels and launches. Because of the mountainous character of the country and the fact that it is cut into many inlets and channels where fishing operations are carried on, the use of aircraft as an auxiliary patrol is of marked advantage in preventing or detecting violations of the fishery regulations. As an example of the possibilities along this line it may be cited that in a single day's flying in southeast Alaska in the summer of 1930 a warden of the bureau covered more than 1,000 miles of fishing grounds in various inlets and straits, making landings from time to time at places where the view from aloft indicated the possibility that fish traps were not properly closed during the weekly period when fishing is prohibited. In addition to the fisheries patrol service, a number of flights were made in connection with general supervisory work and observations of the spawning grounds in certain sections at the close of the fishing season.

COMPLAINTS AND PROSECUTIONS

Four salmon traps in southeastern Alaska were seized for illegal fishing in 1930. A trap at Point Hepburn that belonged to Alaska Pacific Salmon Corporation and one on Etolin Island belonging to Columbia River Packers Association were found not properly closed during a weekly closed period and fines of $400 and $500, respectively, were imposed in the court of the local United States commissioner. The Lincoln Fisheries (Inc.) was fined $1,100 for not closing its trap on Sitklan Island at the end of the commercial fishing season. A case was brought against the Clarence Strait Salmon Co. for operating a trap at a distance of less than 1 statute mile from another trap, but when it was called for trial the defendants failed to appear. Therefore judgment was taken by default and the trap will be sold by the United States marshal.

In southeastern Alaska, also, the operators of four trolling boats were apprehended for fishing during weekly closed periods. A fine of $40 in the case of the *Hazel T–1116* and fines of $25 each in the case of the *T–810* and *T–1209* were imposed when complaints were brought before the commissioner's court. Libel proceedings were filed against

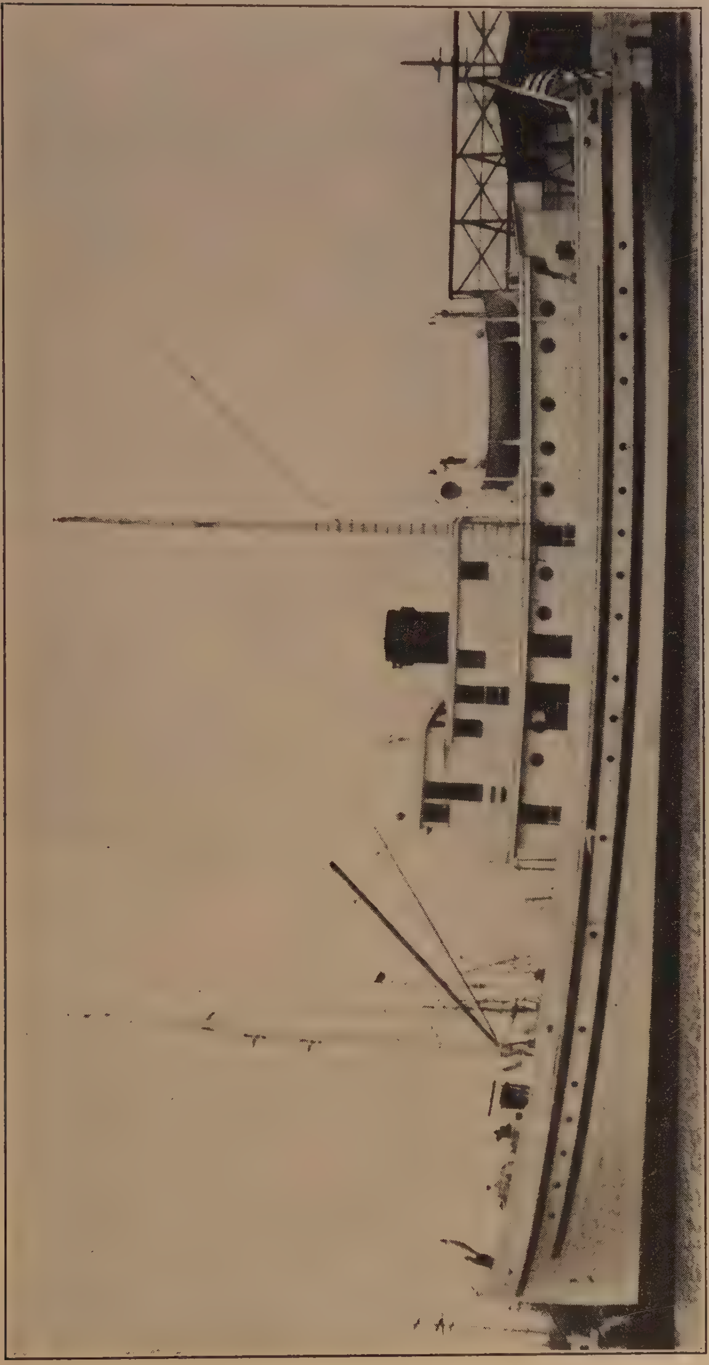

FIGURE 1.—Bureau of Fisheries vessel *Penguin*, tender for the Pribilof Islands

the *St. Claire T-962*, and the case came to trial at Ketchikan on December 15, following which the court held there was insufficient evidence of unlawful fishing. Release of the boat and refund of $122.52, the selling price of the salmon aboard at the time of seizure, were ordered by the court.

Two gill-net fishermen were taken before the commissioner's court at Wrangell, where they pleaded guilty to the charge of fishing at the mouth of a salmon stream at the head of Seclusion Harbor, but declared they were fishing for home use and not for commercial purposes. The commissioner imposed a 12 months' suspended sentence, admonishing the defendants that even though they were taking the fish for personal use it was unnecessary to take them on the spawning grounds when there were plenty of fish in unrestricted waters near by.

Five seine boats were seized in the southeastern district for fishing in waters closed to commercial operations. The captain and three men on the *Mary Louise*, which was found fishing inside the markers at the head of Fillmore Inlet, were sentenced to 15 days each in jail. The owner of the gas boat *Mary* was fined $200 and costs for fishing in the prohibited area at the mouth of a salmon stream in Totem Bay, and salmon aboard the boat were sold for $44.34. Operators of the seine boats *Ulloa* and *Cora*, which were found fishing in closed waters of Hidden Inlet on August 7, pleaded guilty before the United States commissioner at Ketchikan and were given until the close of the season before sentence would be imposed. The crew of the *Ulloa* ultimately escaped penalty through a technicality, while three men on the *Cora* were sentenced to serve 40 days each in jail, a fourth member of the crew being allowed to go free as he was under 18 years of age. The operator of the gas boat *U & I* pleaded guilty to fishing within 500 yards of the mouth of Eagle Creek and was fined $250. The fish on board his boat were sold to a mink farmer for $16.80. All proceeds of sales of seized salmon were turned over to the Department of Justice.

Upon advice of the United States attorney, the case pending against the *Star Lite* for unlawful fishing in 1929 was dropped.

In the Seward-Katalla district 21 cases involving violations of the fishery laws and regulations by 25 individuals and 1 company were brought before local commissioners, the defendants pleaded guilty in every instance, and fines were assessed. One fisherman at Point Whitshed was arrested for taking undersized clams and was fined $25. Eight were apprehended for fishing for salmon during a weekly closed period in the Copper River area and fines totaling $600 were imposed, $100 each in the case of four of the men, and $50 each for the others. Fines in the amount of $150 each were imposed on four operators—one of whom was found fishing in the prohibited area near Dago Slough, one operating the seine boat *N. J. 24* inside the markers in Culross Passage, and the others fishing with seine boats *T-4223* and *T-4091*, belonging to the Pacific American Fisheries, in closed waters of Jack Bay and the Head of Galena Bay, respectively.

Two men operating the seine boat *Robinhood* in closed waters of Jackpot Bay were fined $100 each, which amounts were paid by the San Juan Fishing & Packing Co., who owned the boat. Fines of $100 each were imposed on three men operating seine boats *T-4011* and *T-4002*, of the New England Fish Co., in closed waters of Bay of Isles; and fines of $75 each were assessed in the case of two men fishing with seine boat *T–1420* inside the markers at Harrison Lagoon. The operator of the seine boat *U–106* was fined $100 for fishing for fox feed in the head of Landlocked Bay after the close of the fishing season. The tender *Fidelity*, of the Glacier Packing Co., was seized on July 28 for bringing in fish that had been killed more than 48 hours. On trial before the United States commissioner at Cordova the superintendent of the company pleaded guilty to wanton waste of salmon and was fined $500.

A fisherman found operating an anchored net at Cottonwood Point was fined $200, one operating an anchored net in the protected area at the mouth of Little River was fined $100 on each of two counts, and two others using anchored nets in the Copper River area were fined $100 each. Two shackles of net illegally set for fishing off the entrance to Gumboot Creek and a net near Tiedeman Slough were seized, the owners not being apprehended in either case. Amounts realized from the sale of salmon that were seized in connection with the violations in the Seward-Katalla district totaled $156.30, which proceeds were turned over to the district court at Valdez.

In the Cook Inlet area a trap of the Snug Harbor Packing Co. on the southeast end of Chisik Island was seized for fishing during a weekly closed period. The case was tried before the commissioner at Seldovia, and fines of $150 and $100 were imposed on the company and the watchman, respectively, the latter having admittedly disobeyed instructions in keeping the trap open. The Kenai River Packing Co. was fined $150 for operating a trap of a modified hammerhead type, the tunnel to the pot being made of wire webbing, so arranged that it could not be closed, and with no provision for lowering 25 feet of the webbing next to the pot, as required by law. The Alaska Year Round Canneries Co. was charged with a similar offense, the illegal feature of their trap being the lack of provision for lowering the webbing next to the pot, and a fine of $50 was assessed.

A case was brought before the commissioner at Anchorage against the Point Possession Fish Co. for operating nine set gill nets during a weekly closed period, resulting in a fine of $500. Seven gill nets belonging to the Spur Fish Corporation were seized for fishing during a weekly closed period. As it was evident that the violation was due to a misunderstanding regarding the time required for removing such nets from the water, the fisherman was not prosecuted, but the company was charged with the offense and, pleading guilty through its representative, was fined $70, upon payment of which the nets were released. An independent fisherman was charged with illegal fishing on six separate counts, the violations consisting of the operation of set gill nets within 600 feet of other fixed fishing appliances located on Salamato Beach. On trial before the local commissioner the defendant pleaded guilty to one count and was sentenced to 90 days in jail, with a fine of $500, the other counts being dismissed. A complaint filed against two gill-net operators for fishing before the commercial season opened was dropped because of insufficient evidence.

A gill-net operator was arrested for fishing during a weekly closed period in the Karluk area and was taken before the commissioner at Kodiak, where he entered plea of guilty and was fined $250. A trap owned by the Northwestern Fisheries Co. and operated by the Columbia River Packers Association at Hook Bay was seized for fishing during a weekly closed period. The latter company, through its agent, pleaded guilty to the charge of illegal fishing and was fined $1,500, upon payment of which the trap was released.

Two seine boats, *New Hampshire II* and *Lindy*, of the International Fisheries Co., were seized and eight fishermen were arrested for illegal fishing in Fox Bay during a weekly closed period. The case was brought before the court at Valdez, where the defendants pleaded guilty and were fined, the company being assessed $1,000 and each of the fishermen $50. The boats were released to the owners, and 210 cases of canned salmon from fish illegally taken were left in the care of the United States marshal at Unga for disposition by the Department of Justice.

No violations of the fishery laws and regulations in the Bristol Bay district were observed or reported.

COOPERATION IN TAKING DECENNIAL CENSUS

In conjunction with their patrol duties for the protection of the fisheries, cooperative assistance was rendered by a number of the bureau's employees and vessels in connection with the taking of the Fifteenth Decennial Census in Alaska. The census work was begun in October, 1929, and was carried on whenever possible without interfering with the regular activities of the bureau until the enumeration was completed in the summer of 1930. Such work was performed chiefly in the Kodiak-Afognak area and in the sparsely settled region along the Alaska Peninsula where successful results depend greatly upon familiarity with the inhabited localities and the availability of sea-worthy vessels to reach some of these remote places. The cooperation of the bureau in this matter not only contributed to the effectual accomplishment of the task but brought about a considerable saving to the Government. The Bureau of the Census has expressed commendation and appreciation of the service rendered.

TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the general revenue law of 1921, as amended in 1923, 1925, and 1927. A statement from W. G. Smith, Territorial treasurer, under date of April 15, 1931, gives the collections made to that date for the year 1930. It was stated that collections under the several schedules were fairly complete, although a considerable number of the smaller fisheries companies had not yet made settlement. The outstanding salmon pack taxes, including some gear taxes, amounted to approximately $20,000, while about $5,000 was still to be collected on fish oil and fertilizer and $9,964 under the whale-oil and fertilizer schedule.

Fishery license taxes collected by Territory for fiscal year ended December 31, 1930

Schedule	Division No. 1	Division No. 2	Division No. 3	Total
Salmon canneries (pack)	$180, 848. 75		$127, 991. 56	$308, 840. 31
Clam canneries			87. 39	87. 39
Salteries	1, 440. 91	$139. 95	1, 187. 82	2, 768. 68
Cold-storage plants	1, 425. 00		375. 00	1, 800. 00
Fresh-fish dealers	2, 259. 08			2, 259. 08
Fish-oil works and fertilizer and fish-meal plants	20, 714. 29		5, 447. 90	26, 162. 19
Fish traps	107, 591. 79		56, 177. 78	163, 769. 57
Gill nets	676. 50	51. 34	3, 242. 60	3, 970. 44
Seines	6, 300. 00		3, 045. 00	9, 345. 00
Total	321, 256. 32	191. 29	197, 555. 05	519, 002. 66
Salmon canneries (net income), not possible of segregation as to judicial division				3, 995. 80
Total collections				522, 998. 46

WATER-POWER PROJECTS IN ALASKA

From time to time applications for permits for water-power projects in Alaska are referred to the bureau by the Federal Power Commission for report as to whether the project, if developed, would be seriously detrimental to the fishing interests. Five such applications were given attention by the bureau in 1930. One of these, received in December, 1929, pertained to a proposed water-power development on Lost Creek and Upper and Lower Lost Lakes, which lakes lie about 11 miles north of Seward at an elevation of about 1,500 feet above sea level. An investigation was made by a bureau representative, who reported that Lost Creek, which is the only outlet of Upper and Lower Lost Lakes, is very abrupt and swift and is not a salmon stream. Accordingly, the commission was advised that as far as the fisheries were concerned the bureau could see no objection to the utilization of the waters for power development.

The other four applications were for water-power projects in southeastern Alaska at the following places: (1) Dorothy Lake, tributary to Taku Inlet; (2) Long and Crater Lakes, tributary to Port Snettisham; (3) Lake Perseverance, in the vicinity of Ketchikan; and (4) Mirror, Ella, Manzanita, Swan, Grace, and Orchard Lakes and their outlets, on Revillagigedo Island. Due investigations were made by bureau employees in connection with each application, and upon the basis of reports submitted the commission was notified that the bureau had no objection to the granting of the desired permits, provided that in the outlet to Grace Lake and in Fish Creek, tributary to Mirror Lake, the licensees would agree to maintain a suitable water flow during the salmon-spawning season in order to prevent impairment of the salmon resources because of insufficient water supply on the spawning grounds.

BRISTOL BAY DISTRICT

Work of the bureau at Bristol Bay was carried on as usual, consisting of the enforcement of the fishery laws and regulations, observations of the salmon runs and escapement to the spawning grounds, the construction and operation of salmon-counting weirs, and the repair and betterment of quarters and equipment required for the effective administration of those duties. Agent Dennis Winn organized the work and personally supervised operations in the district during the season.

On April 22 the bureau's patrol vessel *Scoter* sailed from Seattle for Bristol Bay, with Warden N. O. Hardy and five special employees. An employee for the Alaska Peninsula district was also aboard and disembarked at King Cove. Warden Fred R. Lucas and 13 other employees were transferred to Bristol Bay on the *Crane*, which left Seattle on April 23. Agent Dennis Winn sailed from Bellingham, Wash., on May 1 on a vessel of the Pacific American Fisheries, and 11 special employees took passage on a regular transportation steamer from Seattle on May 14. These, together with the *Scoter's* crew and four bureau employees who had remained in the district during the preceding winter, comprised the Bristol Bay force in 1930. Some additional labor was obtained locally for brief periods. All food supplies, light hardware, and miscellaneous equipment were carried by the bureau's vessels, while the heavy shipments, including lumber, cement, machinery, gasoline, and oils, were taken north on cannery freighters.

At the close of the season the *Scoter* sailed for Juneau with Warden Fred R. Lucas and six special employees. The latter continued the journey to Seattle by commercial vessel, while Mr. Lucas remained to assist with the fall patrol and stream survey in southeast Alaska. Eight Bristol Bay employees returned south on regular transportation steamer and 14 on the *Crane*, via Juneau, where one of the latter landed to transfer to a vessel bound for Sitka. One employee, a former resident of the district, did not return to the States, and four remained again to attend to winter duties for the bureau. Agent Dennis Winn and Warden N. O. Hardy, accompanied by Alan C. Taft, who had been conducting scientific investigations of the red salmon in the district, crossed the portage to Iliamna Bay and were conveyed by the bureau's vessel *Teal* to Seward, whence they sailed on a regular transportation vessel to Juneau.

Upon arrival at the marine ways at Naknek all employees assisted with unloading cargo and in getting the boats and other equipment in readiness for the season's activities. Construction of weirs was then begun, the installation of the Naknek weir being undertaken first, the crew for which was transported to the weir camp on May 26. This work is discussed in the special section on salmon weirs. Prior to the opening of the red-salmon season at 6 a. m. on June 25 all arrangements were made for the patrol of the commercial fishing grounds.

Mr. Hardy's report on operations during the season is as follows:

GENERAL REPORT OF SEASON'S OPERATIONS

PATROL

In addition to the inspection of gear in use and the survey of fishing operations to see that the regulations are complied with, the duties of the patrol force include the replacement or repair of bureau markers defining the limits of closed areas, the gathering of pack statistics each week, and the observation and report of the extent of the salmon runs during the weekly closed periods. A constant patrol of all fishing areas was maintained throughout the commercial fishing season. No violations of the fishery laws or regulations were reported, and it is believed that the prosecutions of the preceding season had a tendency to stop willful transgression.

The patrol fleet, consisting of the *Scoter*, seven launches, and a skiff, was assigned to the various sections of Bristol Bay, as follows:

Ugashik River and Bay.—Launch *No. 6*, C. M. Hatton and Johnnie Monson.
Egegik River.—Launch *No. 4*, Elmer Quistorff and Clinton Gross.
Naknek River.—Launch *No. 2*, Adrian Youngsman and Oscar Thorene.
Kvichak Bay and River.—Launch *No. 1*, Ray H. Nichols and George I. Adams.
Nushagak Bay and River.—Launch *No. 3*, Eric Fenno and Wesley Haynes.
Igushik River.—Claude Flock with a skiff.

The *Scoter* was engaged in patrol of the lower limit of the Kvichak-Naknek area from Etolin Point to Middle Bluff Light and was used also by Agent Winn in supervising the bureau's activities in the Bristol Bay district. Launch *No. 7* was employed in connection with weir operations and patrol of the Kvichak-Naknek area, and launch *No. 8* was used in connection with the Ugashik weir.

Data collected in regard to fishing operations showed that 677 fishing boats were operated by the canneries and 191 by independent fishermen—local whites and natives who sold their catches to the canneries. Of the independent boats, 66 were used by white residents and 125 by natives, as compared with 35 by whites and 125 by natives in 1929. The number of commercial stake nets operated decreased from 139 in 1929 to 134 in 1930.

RUNS AND ESCAPEMENT OF SALMON

The run of red salmon in the Bristol Bay district in 1930 was approximately one-third of the average size and resulted in a small pack and a poor escapement to the spawning grounds. Weather conditions, although rough occasionally with considerable rain, were in general favorable to the fishermen and no loss of time was experienced from inclement weather. In order to provide a better escapement, the weekly closed period in the Nushagak district was extended to 60 hours, and in all districts the commercial fishing season was closed one week earlier than the date originally set.

Nushagak River.—The principal run of the season struck in on the flood tide of July 11 at the beginning of a weekly closed period and continued until the morning of July 13. It is estimated that the total escapement for the season was about 60 per cent of that of an average year.

Kvichak-Naknek Rivers.—The main run came in on the flood tide of July 12, at which time large catches were made by the fishermen. The fish continued to run in good numbers during the weekly closed period until the flood tide of July 13, after which there was a marked decrease, and no further run of importance occurred during the season.

Ugashik and Egegik Rivers.—The salmon run was negligible throughout the season, as was the escapement.

DESTRUCTION OF PREDATORY FISHES

Payments from Territorial funds to bona fide residents of the Bristol Bay district, authorized under the 1929 session laws of Alaska for improving conditions of the salmon spawning grounds, have amounted to more than $12,500 for bounty on some 251,000 predatory trout destroyed to September 30, 1930. An additional sum of approximately $350 was expended for labor, fishing gear, shotgun shells, and necessary equipment. The residents of Bristol Bay participating in the destruction of predatory enemies of salmon mostly are natives, although a few white people also are interested in the work and benefit from the amounts they receive as bounty.

INSPECTION OF ILIAMNA AND LAKE CLARK SPAWNING AREAS

The following report was made by Agent Dennis Winn covering his trip of inspection during the month of August:

On August 10 the writer left Naknek on launch *No. 6* for Iliamna Lake to observe conditions in that area. Observations of the escapement into the Kvichak River at the foot of Kaskonak Flats had been made previously by Warden Lucas, and he estimated that about 500,000 red salmon had passed upstream. These made very little showing on the spawning beds at the time of our inspection from August 12 to 17. It was believed that possibly it was still somewhat early for best observations, and therefore a less thorough survey was made than in previous years. However, it was sufficient to show that the escapement was almost negligible for an efficient seeding of such an extensive area as the Iliamna Lake system.

The entrance to the lake was reached on August 12 and the boat was anchored there for the night. Three families of native reindeer herders were camped on the west shore and one family on the east shore. Those on the west shore had very few fish in their caches and few on the racks, in all about 500 salmon; but the natives appeared improvident and the men were intoxicated, as they are nearly every year when this camp is visited. The family on the opposite shore were better providers and they had about 2,000 salmon dried, enough for their winter use.

The following day the trip was continued up the lake, but weather conditions prevented landing at either Belinda Creek or Kokhonak Creek, and the course was directed to Copper River. No indications of salmon were seen en route, and little indication around the mouth of this stream. A local resident who was fishing salmon and trout for dog feed at this place advised that few fish had as yet entered the river. Having just come down the river and observed the salmon, he estimated that not over 5,000 red salmon had ascended. He has been at this location for six years and in his opinion the run this year was much lighter than in 1925. The writer feels, however, from earlier observations in Kvichak River, that later returns will show numbers exceeding those of 1925 by possibly 50 per cent, unless the bulk of the fish are destined for other streams by conditions over which we have no knowledge.

Departure from Copper River for Kokhonak Creek was made on August 14, but it was still impossible to land there because of severe weather, so a trip was made across the lake to Newhalen River. Here the natives appeared to have about sufficient for their winter needs. Many families of natives were camped on both sides of the river and all appeared to be well supplied with cured salmon. Their racks and smokehouses showed about 33 per cent less fish than last year, but there was every assurance that their winter needs were well cared for. An estimate of the quantity of cured salmon placed the number at about 10,000 fish on the east shore and about 5,000 on the west shore.

Information from a reliable source was to the effect that the salmon had not as yet entered Lake Clark, and as the water of Newhalen River is too discolored by glacial sediment for observations no attempt was made to proceed up the river. However, a dory was taken across from Roadhouse Portage to Newhalen River above the rapids and placed in the care of a trader so that it would be ready for use in the future.

Streams along the north shore of Iliamna Lake were then visited. At Roadhouse Portage one or two salmon each night was the limit of the catch for home use and dog feed, whereas in favorable years the nets would be loaded with salmon. A short stop was made at Goose Bay, but no salmon were in evidence. Chekok Creek was examined for a distance of about 3 miles, together with about 1½ miles of a tributary stream, which was cleared of obstructions that prevented the ascent of the fish to spawn. Only 12 red salmon were seen on the trip and but 2 were at spring ponds.

At Knutson Bay a resident white man stated that he had caught and dried about 1,000 salmon for dog feed, which was about all that had entered the stream near his home. Few signs of fish were noted elsewhere in the vicinity. At Pedro Bay an investigation was made of the spring ponds, and it was estimated that about 2,000 red salmon were scattered through the various ponds, approximately 30 being observed at the stream entrance. Some of the supply for winter use at Iliamna Village was taken from this district. In Iliamna River about 100 salmon only were seen, although the local people had a fair supply cured—6,000, according to information given, of which 2,000 came from Pedro Bay. It would appear that practically all the salmon entering Iliamna River were taken by local inhabitants for home use.

The salmon run in this district in 1929 closely resembled that of the beginning of the cycle in 1924. The 1930 escapement was deemed better than that of the corresponding cycle in 1925, but early observations indicated that the main body passed up the Newhalen River to Lake Clark. This was verified later by bureau observers. The generally small size of the fish this year was a feature similar to that observed in the run of 1925.

Further investigations were made in the latter part of August and the first of September by C. M. Hatton, who reported thereon as follows:

Inspection of Belinda Creek on August 25 showed 252 live and 500 spent salmon in the stream. The water was high and somewhat discolored, A local white resident, fishing for trout, advised that four days earlier he had seen in the creek at least 1,000 salmon in three schools. Trout were rather plentiful, and three men fishing with hook and line had taken 1,000 in about one week.

On August 27 Kokhonak Creek was examined and several schools of salmon were observed, but none had more than 20 fish except one school at Big Bluff and the shallows near the small island on the left side going up stream, which contained 350 fish. A total of 3,800 fish were counted from the stream mouth up about halfway to the lake. Approximately 400 dead salmon were lying along the river banks.

Falls Creek, in the vicinity of Copper River, was inspected on August 28 from the lake to the waterfall, in which distance 470 spawning salmon were observed. At this stream 222 rainbow trout were taken in one hour with a beach net. On August 30 in Copper River 6,700 spawning salmon were noted, as well as about 3,500 spent salmon along the bars and on the stream bed. The following day 360 spawning salmon were counted in Tommy Point Creek, about one-third of the number being very small. Seven hauls with the beach seine resulted in a total catch of 280 lake trout and 34 rainbow trout.

Iliamna River was ascended for about 4 miles above the village on September 3, in which distance approximately 200 salmon, all of small size, were observed. The next day Pile River was inspected for about 3 miles, but the water was high and discolored, making it impossible to see the fish. Two small creeks in the vicinity were examined and showed but a very few salmon, although last year they had harbored several thousand fish. It is believed that the escapement in Pile River is similar to that in the creeks.

On September 8 an inspection of Newhalen River by plane showed 2,500 salmon between the lake and Nondalton. Salmon were still coming to the river and the runs compared favorably with those of preceding years. The Newhalen is the only stream in this section that can be reported as fair in salmon escapement this year. A short trip was made along the shore of Lake Clark, but no salmon were visible because of the discolored water.

A resident who had been fishing for trout in the Tularic River reported that 3,250 salmon had entered that stream and 2,500 in a small creek 5 miles above the river.

BECHAROF LAKE DISTRICT

An examination of the Becharof Lake system, which drains into the Egegik River, was made at the close of the fishing season by William E. Sullivan, who reported thereon under date of September 12, 1930, as follows;

> A careful survey of the Becharof Lake spawning grounds shows that the escapement this season has been very poor, by far the poorest it has ever been. Salmon streams tributary to Big Becharof Lake, Island Lake, Upper Becharof Lake, and Ruth Lake were examined, and it is estimated that not more than 500,000 red salmon escaped to these spawning grounds. Only three streams—Crooked Creek, Featherly Creek and Bob's Creek—had a fair run of fish. None of the others had more than 25 per cent of the number they should have had for adequate seeding. None of the small streams had any more than were killed by their natural enemies. There were no salmon spawning along the lake shores nor lying at the mouths of the creeks as is usually the case at the beginning of September.

KUSKOKWIM RIVER

As in previous years, Stream Guard Charles McGonagall was stationed on Kuskokwim River with a chartered launch for about three months during the summer to observe fishing operations.

During the years 1926 to 1929, inclusive, all commercial fishing for salmon in the Kuskokwim area for export from Alaska had been prohibited, but before the salmon run started in 1930 supplementary orders were issued modifying the regulations to permit commercial fishing in parts of Kuskokwim Bay under certain restrictions. The promulgation of such a measure was considered desirable by residents of the district who believed that limited cannery operations would not take an undue proportion of the salmon run and would

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give employment to both whites and natives, thus serving to minimize the effect of the diminished market for dried fish due to the increasing displacement of dog teams by airplanes as a means of transportation for passengers and fur shipments.

Only one cannery, a floating plant belonging to the International Packing Co., was engaged in the district during the season. Its operations, however, were not very successful, and it left for the Alaska Peninsula on July 9. Conditions in the bay are said to be unfavorable for fishing, because the strong tides and shallow water on the flats make it difficult to operate purse seines and gill nets.

The first king salmon entered Kuskokwim River on June 4, and the run continued fairly good for about a month, after which a few were caught from time to time up to August 15. Good runs of reds and chums were entering the river on June 15, and cohos started running July 18, continuing until the last of August. Large catches of salmon were made all along the river by the local residents, but the rainy weather caused a great many of the fish to spoil before drying, even when the racks were covered.

Two white fishermen and 343 natives fished in the river for local requirements, using 805 gill nets of 12,085 fathoms, 55 wheels, and several small boats. The products consisted of 5 barrels of pickled kings, 350½ tons of dried chums, and 31 tons of dried cohos. It is estimated that approximately two-thirds of the reported output of dried salmon was lost through spoiling because of wet weather.

YUKON RIVER

Commercial fishing in Yukon River for export from Alaska is prohibited, but the usual operations were carried on for local requirements and to supply the market for dried salmon throughout the interior of Alaska. Inspector C. F. Townsend and one stream guard patrolled the fishing grounds during the season.

The patrol boat *Coot* left the Government ways at Nenana for the mouth of the river on May 19. The break-up of ice on the Yukon this spring was unusual. Generally, after the ice starts to move, the river is cleared in seven or eight days; but this year, although the ice had broken up at Nenana on May 7, there was one ice jam after another all the way from Ruby to Russian Mission, backing the water over the banks in many places to a depth of from 4 to 5 feet and causing considerable damage to smokehouses and fish wheels. From Kaltag to Holy Cross the vessel was running in ice practically the entire distance, and in several places it was necessary to turn back and go upstream to keep out of the jams. The mouth of the river was reached on June 4, and at that time Bering Sea from Kotlik to St. Michael was still full of ice, which remained until June 11.

White residents at Marshall reported that when they began cutting ice on April 1 for summer use there were large numbers of whitefish in the river. They estimated that in the first half of April about 50 tons of these fish were taken with dip nets, the natives from Mountain Village and Russian Mission participating in the operations. The fish ranged in size from one-half to 3½ pounds. It is a common practice for the natives to maintain traps under the ice to capture whitefish, but ordinarily their catch amounts to only a few hundred fish each winter.

The first king salmon were caught in the south mouth of the river on June 7; the main run began on June 10 and lasted until July 15. Chum salmon were late in entering the river, the run starting on July 3; and while not as large as usual, the run held fairly steady until August 10. A few cohos appeared during the latter part of July, and a big run came into the river about September 1.

Several schools of beluga whales were seen during the summer, a few being as far up the river as Holy Cross, which is unusual. The natives killed a considerable number of them and also of hair seals. The eel run, which is of importance for dog feed as a substitute for tallow or other grease, was very light this fall.

Weather conditions during much of the season were decidedly unfavorable for salmon-fishing operations. Prevailing south and southeast winds during June and July delayed the salmon entering the river. In August the weather was continuously stormy and the river was unusually high. At the river mouth nearly all the operators had their catch dried before the rainy season set in, but from Mountain Village to Russian Mission most of the fish rotted and fell from the racks. On the Tanana River the catch of chums and kings was light, as the water was over the banks all summer and prevented operation of the wheels, but the catch of cohos was the best in years, and favorable drying weather after the first of September facilitated the curing of the fish.

Products of the Yukon and Tanana fisheries were as follows: 386 cases of kings canned; 8,500 pounds of kings, 2,750 pounds of cohos, and 1,200 pounds of chums pickled; 456 pounds of beleke from kings; 500 pounds of kippered kings; and 2 tons of kings, 116 tons of cohos, and 295½ tons of chums dried. Apparatus consisted of 211 wheels, 118 gill nets of 925 fathoms, 1 power vessel, 2 launches, 6 gill-net boats, and miscellaneous small boats. There were 17 whites and 306 natives engaged in the fishery.

WEIRS FOR COUNTING SALMON ESCAPEMENT

The operation of weirs for counting the number of salmon that ascend to the spawning grounds provides a means of determining the ratio between the catch and escapement and furnishes information of value in connection with studies of the life history of the fish. These studies are important not only from the scientific standpoint but for practical conservation purposes. Twenty-six weirs were established in typical salmon streams of Alaska in 1930, an increase of six over the number operated in 1929. Of these, 9 were in southeastern, 13 in central, and 4 in western Alaska.

Reports of operations of the several weirs and of the counts of salmon in 1930 are as follows:

ANAN CREEK

Supplies and lumber for use in connection with weir operations were transported to Anan Creek on May 18 and 19. Preliminary work of putting the cabin and equipment in order, clearing the trail, and transferring lumber to the weir site occupied several days. Construction of the weir was begun on May 22 and completed on June 7, the work having been hindered considerably by high water. A few steelhead trout were noted ascending the stream each day from the time weir activities commenced, but the first count was made on June 8. During the next three days the weir was completely submerged and no count was possible. On June 12 the first pink salmon passed upstream, but no appreciable numbers appeared until June 26, after which the run increased gradually, reaching its peak on July 13, when 33,754 were counted. A second good showing was made on August 3, when 32,215 pink salmon passed through the weir. The numbers declined steadily thereafter until counting was discontinued on September 7. The total escapement of pink salmon was 563,938, by far the largest number recorded in any of the six years that the weir has been in operation. In addition, 1,087 cohos, 65 chums, 57 kings, 20 reds, and 307 steelheads were counted. The work was again in charge of Walter J. Larson, under the general supervision of Assistant Agent S. A. Baker.

CALDER CREEK

The counting of salmon ascending Calder Creek was begun in 1930 by the erection of a new 90-foot weir, work on which was started June 19 and completed the following day. The first salmon passed through on July 15, when seven chums were counted. A few pink salmon appeared on July 29, but the run was very light and irregular until the beginning of September. The weir was maintained through September 29, when the total count of salmon consisted of 34,925 pinks, 27,595 chums, and 95 cohos. Operations were carried on by Richard Emery under direction of Warden C. L. Olson.

EAGLE CREEK

The construction of the weir at Eagle Creek was begun on June 19 and completed on the morning of June 24. Red salmon began to pass through on June 25, chums on July 23, and cohos and pinks on August 13. Very few reds appeared after the 1st of September, while the runs of the other three species were at their height about the middle of that month. The water was too high and discolored to permit counting after October 1, and the structure was removed on October 5. There were 233,992 pink salmon, 23,340 chums, 6,589 cohos, and 6,373 reds counted during the season. The work was in charge of J. A. Kelley, under the direction of Assistant Agent S. A. Baker.

KEETE CREEK

A new 60-foot weir in the small salmon stream at the head of Keete Inlet was completed on June 16 after two days' work. Fifteen red salmon were counted through on July 21, but from that date to September 11 less than 200 salmon ascended. Counting was continued through October 11, when 15,929 pink salmon, 12,220 chums, 1,642 cohos, and 70 reds had been tallied. A. H. Stensland had charge of counting operations, under direction of Warden C. L. Olson.

KLAWAK CREEK

Work on a new weir at Klawak Creek was begun on June 7, when a raft of lumber was brought into Klawak Harbor and towed upstream to the lower falls. From this point all material had to be packed 300 feet over a trail to the weir site. Here the stream is 230 feet wide and has a normal depth of 18 inches, which often increases several feet during freshets. The weir and a camp for the watchmen were completed in one week. Counting began on June 21 with the ascent of the first red salmon. The count of pinks started on July 29, but no appreciable number of this species passed upstream until August 13. The run held fairly steady until September 3, after which low water in the creek hindered or completely stopped the ascent of salmon for 11 days. Heavy rains raised the stream on September 14 and during the week following more than 1,000,000 salmon were tallied. The final count was made on September 24, when the total escapement for the season numbered 1,412,912 pink salmon, 15,615 chums, 13,240 cohos, and 7,044 reds. Ernest Petry was in charge of counting operations, under direct supervision of Warden C. L. Olson.

OLIVE COVE

The Olive Cove weir was established at approximately the same location as in 1929. On June 6 the clearing of the trail and transporting of material from the head of the bay to the weir site was begun. Actual installation of the weir was started a week later and completed on June 25. During the same period a special inclosure, 15 by 32 feet, to hold approximately 800 salmon for scientific study during the season was built, and also a camp for use of the scientist conducting the investigation.

A few salmon were seen in the river below the falls on July 2 and considerably greater numbers within the next few days, but they did not begin to pass through the weir until July 13. The peak of the run occurred during the last week of July, after which there was a gradual decline until August 16, when counting was discontinued. The total number of salmon counted consisted of 134,073 pinks, 38 cohos, and 172 chums. A conservative estimate of the number below the falls at the time the weir was closed, together with the count for the season, places the total escapement of pink salmon at not less than 150,000. Walter Campen, under the direction of Assistant Agent S. A. Baker, was in charge of operations at this weir.

STANEY CREEK

Installation of the weir at Staney Creek was begun on June 21 and finished four days later. The stream at the weir site, 1 mile above the mouth, is 180 feet wide, with an average depth of 2 feet. The first salmon appeared at the weir on July 7, when 2 chums passed upstream. Pink salmon began to ascend on July 22, the numbers increasing very slowly until the 8th of August, after which there was a steady run of fairly good volume for some two weeks. The largest escapement of pink salmon for any one day was on September 14, when 65,310 were counted. Twice during the season heavy rains caused the water to rise 18 inches over the top of the weir, and the structure was finally carried out on October 1, when large logs and trees were swept against it by the current. The total count for the season consisted of 366,881 pink salmon, 20,398 cohos, and 42,967 chums. The work was in charge of J. H. Hall, under the supervision of Warden C. L. Olson.

WHALE PASSAGE

A weir for counting the escapement of spawning salmon was again maintained in Whale Passage Creek, construction being started on June 18 and completed on June 30. The first count was made on

July 21, when 38 cohos passed through the gates. Pinks began to ascend on August 14. From August 23 to 29 there was a good showing as the result of a small freshet, but for the most part dry weather and low water prevailed during much of August and until September 12, which held the fish out in the deep Sound waters. The heaviest run occurred from September 13 to 21, reaching its peak the 19th, on which date 38,169 pink salmon were tallied. The last count was made on October 4, when the total for the season numbered 420,616 pinks, 8,394 cohos, and 7,630 chums. Charles Nelson carried on operations at this weir, under the supervision of Assistant Agent S. A. Baker.

SITUK RIVER

Construction of the weir on the Situk River was started on June 5 and completed on June 14. The first salmon were seen in the river on June 12, and they began to pass through the weir on June 15. Inasmuch as the reported commercial catch exceeded the escapement on July 5, the weekly closed period was extended 24 hours. Counting was continued through July 19, when the work was suspended because of an unusually heavy flood, which submerged the weir and finally carried away about 60 feet of the structure. After the water receded some of the material was salvaged, but not sufficient to rebuild the weir. During the period of high water commercial fishing was light and a large number of salmon escaped to the spawning grounds. The number of red salmon counted through the weir was 191,377, and it is estimated that with the additional numbers that ascended the stream after counting was discontinued the total escapement for the season was not less than 300,000. In addition to the red salmon there were counted 1,455 kings and 858 pinks. Harry A. Pryde supervised operations at this weir.

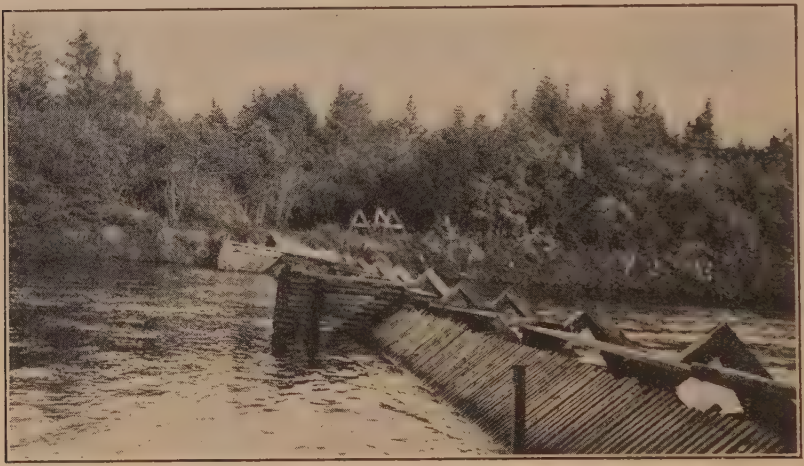

FIGURE 2.—Salmon counting weir, Situk River, Alaska

KARLUK RIVER

Because of a change in the river bed, the Karluk weir was placed some 60 feet below the site formerly used. A completely new structure was built in 1930 from lumber taken up the river in the preceding year, the old materials being carefully piled on the bank for emergency use. Construction was started on May 7 and completed 10 days later. The first salmon were tallied on May 19, and counting was continued through October 8, when the total escapement consisted of 1,096,511 reds, 6,485 kings, 116,330 pinks, and 5,754 cohos. At the time the weir was removed on October 9 there were still a few reds in the lagoon that had not entered the river because of the very low stage of the water.

Departmental regulations prohibited commercial fishing for salmon in Karluk waters prior to 6 o'clock antemeridian June 1, and after September 30. However, as the salmon were late in entering the river, commercial fishing was not permitted until June 21. The run continued very light as the season advanced, and further restrictions were necessary. On July 1 seining was stopped on Karluk beaches between Cape Uyak and Cape Karluk, and all commercial fishing was prohibited in the Karluk district from 6 o'clock postmeridian August 2 until 6 o'clock antemeridian September 1. The commercial take of red salmon from the Karluk run was 155,395, indicating that 12 per cent of the total run was caught and 88 per cent escaped to the spawning grounds.

Except during the seaward migration of young red salmon, the capture and destruction of predacious fishes was carried on by means of traps and beach seines, some 13,500 being taken. As usual, some 50,000 red salmon fingerlings were marked for purposes of scientific study.

Ray S. Wood, under the direction of Warden H. H. Hungerford, was in charge of counting operations at the weir.

ALITAK BAY

The weir at the cannery station was constructed on May 9 and 10, and that at the upper station about two weeks later. The counting of salmon at both weirs began on May 24. In addition to these weirs, which have been operated each season for a number of years, and that on Silver Salmon Creek, which was first maintained in 1929, a new weir was installed in the stream that enters Horse Marine Lagoon, at the eastern end of Olga Bay. The Horse Marine Lagoon weir was completed on June 1 and that at Silver Salmon Creek on June 3; the first salmon were counted through the former on July 9 and through the latter on June 25. Traps for the capture of Dolly Varden trout were maintained at all weirs, and seines were also used from time to time in this work, the total take of these predatory enemies of salmon numbering 104,000 during the season.

As usual, the greater portion of the Olga Bay escapement passed through the upper station weir. Of a total of 286,138 red salmon counted, 259,497 were tallied at the upper station, 9,907 at the cannery station, 3,045 at Silver Salmon Creek, and 13,689 at Horse Marine Lagoon. In addition, 10,320 cohos, 3,813 pinks, and 180 chums were counted through the weirs. The run in Silver Salmon Creek was over considerably earlier than in the other streams. Removal of the weir there was accomplished on September 10, that at the cannery station on September 27, and the other two on September 24. Cohos were still plentiful in the bay the latter part of September, but very few were entering the streams at that time. The total reported catch of red salmon in the Alitak district was 113,769.

The bureau's work in this region was in charge of Henry B. Looff, under the supervision of Warden H. H. Hungerford.

CHIGNIK RIVER

Construction of the Chignik weir was begun on April 25 at a point 10 feet below the site used in 1925. By the afternoon of May 3 all of the tripods were set, but that evening large chunks of ice, some of them about 50 feet square and 2½ feet thick, started coming down the river, breaking six of the tripods and moving the others out of place. Ice continued coming downstream for four days, and not until May 8 was it possible to begin resetting the tripods. In the meantime those that had been carried away were collected, and new tripods were built to replace the broken ones. When work on the weir was resumed it was found to be considerably more difficult than at first, because the river was 5 inches higher and the stream bed had been made very uneven by the action of the ice. However, by May 25 the river was closed so that no fish could pass upstream, and on May 31 the rack was completed.

Dolly Varden trout were first seen descending the river on May 3. While there were more this season than last, there were fewer than in most other recent years. Fairly good numbers of young salmon migrating seaward were observed, although not as many as in 1929. The migration began on May 4 and was light but very steady to June 14, after which it increased each day to July 7. During the remainder of July it was fair, and from August 1 to August 12 there was a gradual decline.

The first red salmon ascending to the spawning grounds passed through the weir on June 12, the latest date on which the run has started since the counting experiment has been in progress. The run, which was light throughout the season and of much shorter duration than usual, was best during the period from July 18 to August 1, reaching its peak on July 24, when 18,891 were counted through the weir and 584 were caught commercially. The fish were small in size, and a larger part of the run than usual was made up of grilse. Counting was continued through September 23, when the total escapement of red salmon numbered 441,679. In addition, 47,873 cohos and 2,030 kings were tallied at the weir. The runs of pink and chum salmon were light and no count was made of them, as most of the fish of these species spawn in streams emptying into the lagoon and bay below the weir.

By departmental regulations commercial fishing for salmon in the Chignik area is prohibited prior to June 1 and after October 1. The scarcity of salmon, however, necessitated stringent curtailment of fishing operations. Only three traps were operated in Chignik Bay and Lagoon, one of which was brailed first on July 9, one on July 16, and one on July 18; while all were brailed for the last time on August 11. The total reported catch of red salmon from the Chignik run was 20,768. Warden Charles Petry was in charge of the bureau's work at Chignik.

AYAKULIK OR RED RIVER

The work of erecting the Red River weir was begun on May 21 and completed in time to make the first count of salmon on May 27. A few reds and kings had appeared in the stream on May 23. The weir was maintained until the close of September 2, at which time a freshet that had started to develop on the previous day began to bring down so much river weed and so many spent pink salmon that it was necessary to remove the structure. The total count during the season consisted of 133,796 red salmon, 2,748 kings, 609,915 pinks, and 5,170 cohos. Except when young red salmon were coming downstream in large numbers, traps and seines were operated in the river above the weir to capture predatory trout, and some 45,000 of these fish were destroyed.

Operations at this weir were in charge of Henry B. Looff, under the direction of Warden H. H. Hungerford.

UGANIK RIVER

A crew of workmen, together with supplies and lumber, were transported to the Uganik weir site on May 29, construction was begun promptly, and by June 4 the weir was completed. No difficulty was experienced in maintaining it throughout the season, as there were no freshets. The first salmon passed through on June 5 and the last on September 10, during which time the total escapement numbered 9,823 reds, 4,075 pinks, 1,978 cohos, and 2,714 chums. Large numbers of pinks and chums spawn in the river and sloughs below the weir. Attention was given to the extermination of predatory trout while the weir was in operation, resulting in the capture of 4,892 of these fish. H. Olafson was in charge of the work at this place, under the direction of Warden H. H. Hungerford.

KAFLIA BAY

On June 5 the watchman and supplies were landed at Kaflia Bay and the work of establishing the weir in the salmon stream at the head of the bay was begun. As usual at this time of year the creek was rather high, but operations progressed satisfactorily and the structure was completed on June 9. Salmon were first seen in the bay on June 12, but none passed through the weir until June 25. Counting was continued through August 27, at which time the run had practically ceased. When the weir was removed on September 14 there were still a few salmon in the bay that would not enter the stream. The total count of red salmon was 12,284. No pinks were tallied, as most of them spawned below the weir. Young red-salmon migrants were seen coming downstream in the latter part of June and early in July. No great numbers of Dolly Varden trout were observed; and bears, although numerous, did not molest the weir. As a result of an improvement to the salmon stream between the two lakes during the latter part of August whereby the water was concentrated into one channel, the fish were enabled to ascend to the upper lake more readily. Louis Thompson, under the direction of Warden H. H. Hungerford, was in charge of the weir operations.

ENGLISH BAY

The escapement of salmon into the stream at the head of English Bay was counted through a weir established at the same location as in the previous year. This structure, 128 feet in length with two counting gates, was ready for operation on May 23. Salmon began to pass upstream on May 26 and the run continued through July 26, during which time there were counted 18,858 reds. Jack Tansy was in charge of the bureau's work at this place.

CHINIK CREEK

Work of installing the weir at Chinik Creek was begun on June 10 and completed on June 17. A good number of salmon were noted in the vicinity on the latter date, but none passed through the weir until July 3. It was observed that the salmon apparently entered the mouth of the stream at high tide, but went out again beyond the closed area when the tide receded and so were captured by the fishermen. Therefore it was recommended that additional waters in this locality be closed to commercial fishing, and a regulation to that effect was issued on July 3, after which a heavier run of fish began ascending the falls. The weir was maintained through July 31, when the total count for the season numbered 23,638 red salmon. It was estimated that approximately 150 salmon were in the stream below the rack at the time it was removed, but none were seen outside the mouth. Vincent M. Scribner carried on the counting operations at this weir.

KALGIN ISLAND STREAM

A stream guard was again stationed near the mouth of the salmon stream on Kalgin Island to count the ascending salmon, destroy predatory trout, and open the channel when the action of tides and rough seas filled it with sand and gravel. No weir is maintained, as the channel is but a few feet wide and the watchman has no difficulty in counting the salmon that ascend during the day. From June 6 to August 12, inclusive, there were counted 7,100 red salmon and 2,040 cohos. It is estimated that as many more entered on the night tides, making the total escapement for the season 14,200 reds and 4,080 cohos. Lee Waddell carried on the work at this place.

ORZENOI RIVER

The weir for counting the escapement of salmon in Orzenoi River was put in readiness for operation by May 23. A watchman was stationed there on July 1, and the first salmon passed through the counting gate on July 3. From that date until the weir was removed on August 15 the total count consisted of 1,923 red salmon, 1,505 pinks, and 15 chums. No red salmon were in the river below the weir when counting was discontinued, although a few pink salmon were observed. Walter Forrest, under the supervision of Capt. J. J. O'Donnell, conducted operations at this weir.

MORZHOVOI BAY

Installation of the Morzhovoi weir, on the salmon stream emptying into Middle Lagoon, was completed on July 1. Salmon were first seen at the mouth of the lagoon on July 3 and they began to pass upstream on the following day, the run continuing until September 8. The total count for the season was 23,551 red salmon. Work at this weir was carried on by Harry Hegman, under the direction of Capt. J. J. O'Donnell.

BEAR RIVER

A weir was put into operation for the first time this year in Bear River, approximately 14 miles upstream from Bering Sea. Considerable difficulty attended the transportation of material to the site, as the river was at very low stage in the spring. Little lumber could be carried at a time, and each trip required two days. However, a temporary rack was ready in time to count the first of the run, and improvements were made to the structure as soon as conditions permitted. Counting began on July 9 and ended on August 9, during which period the total escapement was 37,376 reds, 1,288 chums, and 13 kings. C. R. Sullivan, under the direction of Capt. J. J. O'Donnell, was in charge of the construction and counting operations.

NAKNEK RIVER

On May 27 the erection of the weir in Naknek River was begun at a point about 50 yards upstream from the site occupied in the previous season. The tripod type of weir was again used, with the tripods placed 14 feet apart and the fence entirely of pickets with no section of wire netting, in order better to withstand the pressure of swift water and floating débris. Low water in the river facilitated the work and the structure was completed before the salmon began to ascend to the spawning grounds, their passage being blocked on June 20. The weir, which was 1,184 feet in length, had seven counting gates and one large boat gate.

The first red salmon were observed on June 26, when 143 were counted through the weir. The bulk of the run passed upstream in two 5-day periods, from July 3 to 7 and from July 11 to 15, inclusive, the highest count for any one day being 40,020 on July 14. After July 15 there was a gradual decline, and counting operations were discontinued at the close of August 9, on which day but 6 red salmon, together with 536 kings and 54 cohos, passed through the weir. The total count for the season consisted of 287,208 reds, 1,999 kings, 255 cohos, 331 chums, and 28 pinks.

It was observed that the red salmon were strikingly uneven in size, some being very large, and many very small. Each day there were seen below the weir many salmon that were not more than 12 inches long. Rainbow trout were plentiful, apparently much more so than in preceding years, and there were also a great many lake trout, but very few Dolly Vardens were taken at the weir site. Schools of migrating salmon were observed going down the river during the early part of June and again during the second week in July, but unless others descended before work at the weir was started it is evident that the migration this season was much smaller than in 1929. William E. Sullivan, under the supervision of Agent Dennis Winn, was foreman at this weir except for a short time at the beginning and end of the season when he was engaged on the bureau's work in the Becharof Lake district.

UGASHIK RIVER

Construction of the weir on the Ugashik River was started on June 10 and completed on June 27. Red salmon began to appear below the weir on June 24 and another school arrived on July 1, but the first count through the rack was on July 2, when 15 reds passed upstream. Not until July 12 did they ascend in any appreciable numbers. The run at the weir reached its peak on July 22, with a count of 57,614 for the day, after which there was a rapid decline. Counting was discontinued at the close of August 10, when the total escapement for the season was 168,988 red salmon, 186 chums, 21 kings, and 18 pinks. Henry McFadden, under the direction of Agent Dennis Winn, was in charge of operations at this weir.

KVICHAK RIVER

Attempts to operate a weir on the Kvichak River were unsuccessful in 1927 and 1929 because the structure was destroyed each time before completion by pressure from high water resulting from the clogging of the netting with algæ and other vegetation. A different type of weir was therefore installed in 1930. It consisted of a picket section of the tripod type on each side of the river—that on the left side extending 80 feet from the bank, with four 24-inch counting gates, and that on the right side extending 270 feet from the bank with eight 24-inch counting gates—and between them an electric screen, 780 feet in length made of galvanized iron chain and pipe. The entire weir was built in a V shape, with the apex down river, at an angle of 22° from a line at right angles to the channel. Modern electric equipment was located on the left bank of the river. Both the power plant and the weir were completed on July 1.

The first red salmon were observed below the weir on July 6 and some were seen jumping in the screen field, after which they would dart down river into the uncharged water, where they would swim around in good condition. The following day a few were noted passing upstream through the screen field. It was therefore decided to increase the voltage. During the period from July 9 to 15 every effort was made to adjust the electric current so that it would hold all of the salmon below the weir without injury to those that came into the screen field, but some salmon continued to pass through, while others were temporarily stunned and drifted to the bottom of the river, there to recover in a few seconds and swim away. Although the counting gates in the picket sections of the weir were kept open, very few salmon were seen passing through them. The only reasons that could be ascribed for this were that the gates were in shallow water and not in the main river channel, and the water flowed through them at an angle toward the main channel.

On July 16, as an experiment, the current was turned off the chain electrode in the boat passage, white canvas was spread on the river bottom at a depth of 15 feet, a pile driver was anchored just above the boat gate and an observer was stationed on the top of the pile-driver gins, approximately 35 feet above the surface of the water, where he could count fairly accurately on a bright day the salmon swimming through the passage. The number counted on that day was 31,361. The experiment was continued through July 20, but the number diminished daily, and apparently only the fresh salmon coming up the river would go through the boat gate, while there were still many along the river below the weir. Counting was therefore discontinued at the close of July 20, when the count for the season numbered 80,223, or but a fraction of the total number actually escaping upstream.

The power plant was shut down and the gates were opened on July 21, but the majority of the salmon did not go up the river for several days. One school of good size was noted on July 31, after the picket weir was removed, but by August 10, when work at the weir site was completed, no salmon were in evidence in the river.

The work at this place was in immediate charge of Warden Fred R. Lucas under the general supervision of Agent Dennis Winn.

SALMON TAGGING

In continuation of studies of migration routes of salmon, tagging experiments were again carried on in southeastern Alaska under the direction of Dr. Willis H. Rich. The work was performed by Warden Frank W. Hynes with the assistance of the crew of the *Murre* and was carried on at intervals between July 13 and August 14, both dates inclusive. There were tagged and released approximately 2,000 salmon taken from traps on Sitklan Island, Kanagunut Island, and near Cape Fox, and about 1,500 in the vicinity of Kasaan Bay and Windfall Harbor on the west shore of Clarence Strait. While some of all species of salmon were tagged, the majority were pinks. Reports indicate that approximately 1,000 of the tagged fish were recaptured. Complete data on the experiments will be published in a separate document.

SALMON LIFE-HISTORY STUDIES

A comprehensive program concerning biological studies of the Pacific salmons was carried forward in Alaska in 1930 under the direction of Dr. Willis H. Rich, chief investigator of salmon fisheries. This work, which deals largely with the important red-salmon runs, was conducted at Karluk by Doctor Rich and one assistant, Joseph T. Barnaby; at Chignik by Harlan B. Holmes; at Bristol Bay by Alan C. Taft; and in the Copper River region by Seton H. Thompson. Dr. Frederick A. Davidson continued investigations in southeastern Alaska which were begun the previous year to determine the application of the parent stream theory to the life history of the pink salmon, the principal species in that district.

As heretofore, red-salmon fingerlings were marked at Karluk and Chignik as they were migrating seaward, some 50,000 being marked at each place, and samples of scales of adult red salmon were collected in various localities for study of the age of the fish at maturity. These activities are covered fully in a separate document.[2]

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

In conformity with the bureau's established practice, most of the important salmon streams in Alaska were visited during and subsequent to the closing of commercial fishery operations for the purpose of estimating the escapement of salmon, which under the law must at least equal the commercial catch in order to perpetuate the runs. At the same time observations were made as to general conditions such as the volume of water on the beds, presence of barriers which might impede the ascent of the fish, and other factors having to do with the successful seeding of the streams. The reports received from field employees intrusted with this important duty are of marked importance in connection with the revision of regulatory measures intended to maintain the yield of the salmon fisheries at the highest possible level.

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[2] Progress in Biological Inquiries, 1930. Appendix III, Report, U. S. Commissioner of Fisheries, 1931. In press.

Southeast Alaska.—In the southern district the arrival of the run of pink salmon was considerably later than usual, few fish appearing until late in July, when they struck in along the Cape Fox and Kanagunut Island shores in unprecedented numbers and continued to run heavily until after the close of commercial operations. In the fore part of the season pinks were unusually small, but toward the middle of August their size increased, although the average size for the year was below normal. Fair runs occurred along the shores of Duke, Annette, and Gravina Islands, through Behm Canal, and along Cleveland Peninsula, although not approaching the volume of the Cape Fox run. A heavy rainfall early in September was of inestimable value, as vast schools of salmon had collected about the mouths of streams since the middle of August, all but the larger rivers being so low that fish could not ascend to the spawning grounds. During most of September conditions were ideal for spawning, but toward the end of the month and in the first few days of October the rainfall was exceedingly heavy and raised the streams far above normal, no doubt causing loss of eggs in certain areas, although heavy seeding in many streams probably compensated in large measure for such loss.

Nearly all of the streams along the entire west coast of Prince of Wales Island had very satisfactory escapements of salmon. In this region, as in the southern district, the runs were later than usual. The runs at Klawak Inlet, Staney Creek, Hunter Bay, and in most of the large streams in this district were greater than for several years past. An unusually dry summer created a serious condition in some localities for a time, as loss of fish occurred because of insufficient water in a number of salmon spawning streams. This condition prevailed for about three weeks prior to September 15, after which heavy rains made it possible for the salmon to ascend to the spawning areas.

On the east shore of Prince of Wales Island the run was light until late in the season, but after the close of commercial fishing good runs occurred in all of the streams from Moira Sound northward, particularly heavy escapements being noted in streams tributary to Lake Bay and the head of Whale Passage. The run was generally good throughout Ernest Sound, Sumner Strait, and Wrangell Narrows, although more irregular than in the southern streams, some sections having heavy escapements while others were inadequately seeded.

In the Icy Strait and western districts the pink-salmon run was comparable to that of 1929, while in the eastern district an enormous run of this species occurred—probably the largest recorded for that section. Red salmon were distinctly more numerous in all three districts than in the preceding year, but the runs of chums and cohos were light throughout the season. In the Yakutat district reds and cohos were unusually abundant, but the runs of kings and pinks were very light.

Southeastern Alaska as a whole had a satisfactory escapement, more salmon reaching the spawning grounds and under better conditions than in any recent year. The run of pinks was exceptionally large, reds showed a substantial increase over the average for recent years, cohos and kings were fairly abundant except in a few sections, while chums were below normal.

Prince William Sound and Copper River region.—Good runs of all species of salmon occurred in Prince William Sound. That they arrived somewhat later than usual and continued well beyond the close of commercial fishing operations was a contributing factor in assuring a heavy escapement, particularly of pinks and chums. Final inspection of the spawning grounds showed that the fish were more evenly distributed than in the preceding year, and that the escapement was satisfactory in virtually all streams except in the Port Wells region.

In the Copper River region king salmon began to arrive early in May and the run was of about normal size. The run of red salmon began about the middle of that month and reached its peak the first week of June. The escapement of reds was not considered sufficient for full seeding of the spawning beds. The fall run of cohos was heavy, and although the catch was large there was a satisfactory escapement.

Cook Inlet.—The salmon run in this district as a whole was abnormal and irregular. To July 14, few fish except kings were found north of Anchor Point, but beginning with that date a heavy run of cohos began along the west shore of the inlet, reaching its greatest volume north of Trading Bay. Both reds and pinks were far below normal in this section. On the east shore the runs were of about normal volume along Salamato Beach from East Foreland to the Kenai River, but only small numbers appeared between the Kenai and Kasilof Rivers. The run of pinks into Kachemak Bay and along the coast to Point Gore was the heaviest recorded in several years, and the escapement, both of pinks and chums, was ample, practically all streams in this locality being seeded to capacity. Escapement into the Kasilof River, Tustumena Lake, and tributary streams was considered normal, although reds were not so numerous as in 1929, while seeding of streams tributary to Kenai Lake was scarcely adequate. Russian River had a fair early escapement of reds, and cohos were found in good numbers on the spawning grounds toward the close of the season. Fish Creek and the lakes drained by this stream were well seeded with reds and cohos, while Cottonwood Creek and lakes had light escapements.

Kodiak-Afognak district.—The runs of red salmon were unusually light throughout the district. In the early part of the season pinks and chums also ran light, and the closed period from August 2 to September 1, effective in almost the entire area, was accordingly established to protect the future runs. As a result of the curtailment of commercial operations, the escapement was much larger than the catch, and a number of the important salmon streams were fairly well seeded. Among those that had particularly good escapements of pink salmon were Red River and streams tributary to Kiavak Lagoon, Kaguyak Bay, Afognak Bay, Tonki Bay, Izhut Bay, Red Fox Bay, and Blue Fox Bay. Along the mainland shore the runs of pinks and chums were reported to be the best since 1926. During the fall good runs of cohos appeared in Red River, Kiavak Lagoon, Kaguyak Bay, Seal Bay, and Afognak Bay.

Chignik.—The failure of the run of red salmon at Chignik was wholly unexpected and inexplicable, as the escapements on which this run was based were good. Although commercial operations were sharply curtailed and but a small percentage of the run was taken, the escapement was only about one-third the average at this place.

Alaska Peninsula.—On both the south and north sides of the Alaska Peninsula the runs and escapements of red salmon were poor. In Ikatan Bay and False Pass there was a good escapement of chums and pinks. A very heavy run of pinks occurred in Belkofsky, Volcano, and Pavlof Bays and the escapement was correspondingly good, while the escapement of chums in these waters was lighter. On the mainland from Cape Tolstoi to Kupreanof Point there was likewise a heavy escapement of pinks and a fair escapement of chums. All pink and chum salmon streams in the Shumagin Islands district were well seeded. Cohos were in evidence throughout the entire season, appearing first in early June, and the pack of this species was the largest for several years. On the south side of the peninsula as a whole there was a good escapement of pinks and cohos, the chum escapement was slightly below normal, and reds were very light.

Bristol Bay.—The red-salmon run throughout the Bristol Bay region was far below normal, as had been anticipated. To meet the situation commercial fishing was greatly restricted, and the catch was approximately one-third that of the preceding year. Nevertheless the escapement was insufficient for even a fair seeding of the vast spawning areas, particularly so in the Egegik and Ugashik areas.

As in previous years, an examination of the Iliamna-Lake Clark spawning areas was made by Agent Dennis Winn, whose report thereon is printed elsewhere in this document.

HATCHERIES

EXTENT OF OPERATIONS

Salmon propagation in Alaska was carried on at two Government-owned hatcheries (at Afognak and McDonald Lake) and at one privately owned hatchery—that of the Northwestern Fisheries Co. at Hugh Smith Lake.

Operations of Federal and private hatcheries in Alaska in 1930

Location of hatchery	Red or sockeye salmon		
	Eggs taken in 1929	Salmon liberated in 1929–30	Eggs taken in 1930
Afognak	22, 000, 120	15, 100, 000	[1] 6, 262, 790
McDonald Lake	16, 095, 000	14, 332, 000	[2] 27, 469, 000
Hugh Smith Lake (Quadra)	11, 760, 000	11, 285, 000	21, 190, 000
Total	49, 855, 120	40, 717, 000	54, 921, 790

[1] Also 123,904 steelhead-trout eggs and 10,964,470 pink-salmon eggs were collected. Of the latter, 10,155,776 eyed eggs were shipped in October and November to the Department of Fisheries and Game of the State of Washington.

[2] Also 7,055,000 pink-salmon eggs and 100,000 chum-salmon eggs were collected. Shipments totaling 6,107,000 eyed pink-salmon eggs and 3,055,000 eyed red-salmon eggs were forwarded to Seattle for distribution, including 1,187,000 red-salmon eggs transferred to the bureau's hatchery at Birdsview, Wash.

AFOGNAK

Of the 22,000,120 red-salmon eggs collected at the Federal salmon hatchery at Afognak in 1929, 4,553,200 in the eyed stage were shipped to Seattle in October. From the remaining eggs there were produced and planted in Litnik Lake and its tributaries 3,120,000 fry and 11,980,000 No. 1 fingerlings. The net loss on the total take, therefore, was 10.7 per cent.

During May, 1930, 123,904 steelhead trout eggs were taken at the outlet of Litnik Lake. Of the fry hatched therefrom 110,000 were liberated as No. 1 fingerlings in Island Lake in July.

The collection of red-salmon eggs began on July 29 and ended on September 10, 1930, with a total take of 6,262,790. Pink-salmon eggs were collected between August 18 and September 10, in which period 10,964,470 eggs were secured. In October and November 10,155,776 eyed pink-salmon eggs were shipped to the Department of Fisheries and Game of the State of Washington.

Efforts to decrease the number of Dolly Varden trout in Litnik Lake and its tributaries were continued.

M'DONALD LAKE

At the Federal salmon hatchery on McDonald Lake 330,000 advanced fry were released in March, 6,002,000 No. 1 fingerlings in June, and 8,000,000 No. 3 fingerlings in September, 1930, from the 16,095,000 red-salmon eggs taken in 1929. The net loss on the take, therefore, was about 11 per cent.

Of the 2,650,000 pink-salmon eggs secured in 1929, 1,021,000 eyed eggs were shipped to Seattle; the remainder were incubated and produced 1,389,000 fish, which were planted as advanced fry in the hatchery slough during March and April.

In 1930, 27,469,000 red-salmon eggs were collected at this station from September 1 to September 25, 7,055,000 pink-salmon eggs from August 22 to September 25, and 100,000 chum-salmon eggs from September 12 to September 19. Several shipments of eyed eggs, aggregating 6,107,000 pink-salmon eggs and 3,055,000 red-salmon eggs, were forwarded to Seattle between September 18 and November 11 for distribution, including 1,187,000 red-salmon eggs transferred to the bureau's hatchery at Birdsview, Wash.

HUGH SMITH LAKE (QUADRA)

The Northwestern Fisheries Co. liberated 11,285,000 red-salmon fry from its hatchery near Boca de Quadra in 1930, hatched from 11,760,000 eggs taken in 1929, a loss of 4 per cent. In 1930 the take of eggs began on August 2 and was continued until September 17, during which time 21,190,000 red-salmon eggs were collected.

HATCHERY REBATES

The owners of private salmon hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red salmon fry liberated by them in Alaskan waters. In the fiscal year ended June 30, 1930, only one such private salmon hatchery was operated—that of the Northwestern Fisheries Co. at Hugh Smith Lake—and the rebate due on the 11,285,000 red-salmon fry liberated there during the year amounted to $4,514.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1930 was 27,568, or 1,715 less than in 1929. Fishery products were valued at $37,679,049—a decrease of $13,116,770, or about 26 per cent, from the preceding year. Of the total amount, 83.7 per cent represented the value of salmon products; 7.9 per cent, halibut; 5.7 per cent, herring; and 2.7 per cent, the value of all other fishery products.

Summary of persons engaged and products of the Alaska fisheries in 1930

Items	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites	7, 142		4, 391		3, 918		15, 451	
Natives	2, 780		1, 109		1, 073		4, 962	
Chinese	213		277		281		771	
Japanese	572		450		236		1, 258	
Filipinos	2, 063		1, 306		853		4, 222	
Mexicans	25		97		611		733	
Kanakas	16		4		11		31	
Porto Ricans			3		18		21	
Negroes	2		16		72		90	
Miscellaneous	1		1		27		29	
Total	12, 814		7, 654		7, 100		27, 568	
PRODUCTS								
Salmon:								
Canned ... cases	2, 977, 286	$15, 174, 134	1, 618, 545	$9, 624, 234	436, 495	$4, 896, 530	5, 032, 326	$29, 694, 898
Mild cured ... pounds	4, 323, 925	850, 380	123, 600	18, 342			4, 447, 525	868, 722
Pickled ... do	151, 600	15, 257	544, 100	64, 392	167, 250	23, 992	862, 950	103, 641
Fresh ... do	1, 295, 216	117, 620					1, 295, 216	117, 620
Frozen ... do	6, 590, 806	560, 520	10, 800	648	12, 600	680	6, 614, 206	561, 848
Dry-salted, dried, and smoked ... do	19, 200	2, 400	3, 600	565	1, 590, 956	115, 220	1, 613, 756	118, 185
Smoked and packed in olive oil ... cases	99	891					99	891
Pudding ... do			32	160			32	160
Eggs and heads canned for dog feed ... do	1, 081	4, 324					1, 081	4, 324
Fertilizer ... pounds	2, 187, 100	49, 254	96, 782	2, 420			2, 283, 882	51, 674
Oil ... gallons	51, 868	9, 320	4, 015	1, 205			55, 883	10, 525
Halibut:								
Fresh ... pounds	21, 662, 879	2, 243, 131	9, 300	655	6, 164	368	21, 678, 343	2, 244, 154
Frozen ... do	7, 707, 575	608, 082	1, 573, 050	94, 383	594, 997	44, 625	9, 875, 622	747, 090
Cheeks, frozen ... do			3, 119	156			3, 119	156
Herring:								
Fresh, for bait ... do	2, 966, 255	36, 609	273, 300	4, 422	100, 625	1, 006	3, 340, 180	42, 037
Frozen, for bait ... do	5, 957, 960	60, 807					5, 957, 960	60, 807
Frozen, for food ... do					78, 750	3, 544	78, 750	3, 544
Pickled, for food:								
Scotch cure ... do	1, 382, 895	87, 221	3, 011, 375	166, 195	3, 686, 975	209, 394	8, 081, 245	462, 810
Norwegian cure ... do	90, 250	5, 363	11, 500	920	43, 625	2, 873	145, 375	9, 156
Special cure for repacking ... do	33, 600	2, 520					33, 600	2, 520
Roused, for food (bloater stock) ... do	12, 500	500			340, 000	14, 545	352, 500	15, 045
Spiced ... do	2, 000	300					2, 000	300

Dry-salted	do					150,750	6,395	150,750	6,395
Meal	do	19,502,823	557,576	3,908,200	97,474			23,411,023	655,050
Oil	gallons	2,943,915	729,984	601,507	146,029			3,545,422	876,013
Cod:									
Dry-salted	pounds			173,502	8,269	13,000	765	186,502	9,034
Stockfish	do			15,600	2,090			15,600	2,090
Pickled	do			110,135	5,265	10,000	400	120,135	5,665
Whale:									
Oil	gallons			434,200	196,441	382,500	174,835	816,700	371,276
Sperm oil	do			12,650	4,744	108,500	40,687	121,150	45,431
Fertilizer	pounds			1,084,000	23,960	1,256,000	27,440	2,340,000	51,400
Pickled meat	do					37,000	1,850	37,000	1,850
Whalebone	do					5,600	308	5,600	308
Clams:									
Canned	cases	523	3,600	32,276	238,231			32,799	241,831
Juice	do	3	9					3	9
Whole in shell	dozen			100	50			100	50
Crabs:									
Meat	pounds	53,545	23,890	33,916	10,183			87,461	34,073
Whole in shell	dozen	332	664	442	660			774	1,324
Shrimp:									
Meat	pounds	510,956	210,072					510,956	210,072
Whole in shell	do	2,870	431					2,870	431
Trout:									
Canned	cases	122	854	30	120			152	974
Smoked and packed in olive oil	do	66	594					66	594
Fresh	pounds	49,013	6,581	13,050	1,461			62,063	8,042
Frozen	do	8,793	618	18,060	1,806			26,853	2,424
Pickled	do			450	50			450	50
Sablefish:									
Fresh	do	16,073	574					16,073	574
Frozen	do	422,590	19,400					422,590	19,400
Pickled	do	10,800	540					10,800	540
Smelt:									
Fresh	do			37,720	5,281			37,720	5,281
Rockfishes, frozen	do	5,876	122					5,876	122
"Lingcod":									
Fresh	do	423	13					423	13
Frozen	do	22,403	672					22,403	672
Flounders:									
Fresh	do	245,000	6,125					245,000	6,125
Frozen	do	73,936	1,829					73,936	1,829
Total			21,392,781		10,720,811		5,565,457		[1] 37,679,049

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[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch, exclusive of whales, to the fishermen was approximately $12,285,000. The round weight of the salmon catch landed by the fishermen was approximately 426,441,857 pounds, and the corresponding figures for herring were approximately 145,671,895 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 5,963,204 pounds of dry-salted cod, having a total value of $302,118, landed at ports of the Pacific Coast States.

SALMON

Outstanding features of the salmon industry in Alaska for 1930 were the marked fluctuations in the yield of red and pink salmon. The catch of reds was the smallest for any year in the last three decades and was due primarily to the scarcity of the fish in the important Bristol Bay area. There was a decided shortage of this species also in the Chignik and Karluk River regions of central Alaska, while in the southeastern district, which ordinarily contributes a comparatively small proportion of the red salmon output, the run was better than the average for recent years, and the catch was nearly 24 per cent of the total yield of red salmon for the Territory.

The number of pink salmon taken was the largest in the history of the industry. However, the average size of the fish, particularly in southeastern Alaska during part of the season, was noticeably small, and the total pack of canned pink salmon was somewhat less than the record output of that species in 1926. The catch of pink salmon in the southeastern district was more than twice that of the preceding year. Western Alaska also showed an increase in the number of pinks taken, but it is only a small producer of that species. While the catch of pinks in central Alaska was somewhat less than in 1929, it compared favorably with the average for recent years. Since 1927 the once striking variation between the even years of plenty and the lean odd years has given way to more level production of pink salmon in the central district.

The total catch of salmon increased approximately 15 per cent over that for 1929. By districts, southeast Alaska showed a gain of 82 per cent, while in central and western Alaska the catch decreased approximately 17 per cent and 53 per cent, respectively.

There was a decrease of 1 per cent for the whole of Alaska in the number of fathoms of seines used, while the number of fathoms of gill nets decreased about 5 per cent and the number of traps about 2 per cent from those in operation in 1929.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1930 was 796, of which 187 were beach seines and 609 purse seines. The beach seines aggregated 22,643 fathoms of webbing and the purse seines 93,754 fathoms. The number of gill nets used was 5,100, having a total length of 274,615 fathoms. There were 278 driven traps and 423 floating traps—a total of 701.

Southeastern Alaska was accredited with 421 seines, or a total of 73,339 fathoms of webbing, a decrease of 48 seines and 8,054 fathoms of webbing from the number in 1929; also with 361 gill nets, aggregating 21,365 fathoms, an increase of 40 nets but a decrease of 4,115 fathoms; and with 63 driven and 381 floating traps, a decrease of 3 driven and an increase of 3 floating traps from the number operated in 1929.

Corresponding figures for central Alaska show 354 seines, or 39,168 fathoms, as compared with 313 seines, or 33,779 fathoms in 1929; 2,555 gill nets, or 119,990 fathoms, as compared with 1,808 gill nets, or 98,030 fathoms in 1929; and 213 driven and 42 floating traps, as compared with 224 and 44, respectively, in 1929.

In western Alaska 21 seines, or 3,890 fathoms of webbing, were used, an increase over 1929 of 8 seines and 1,075 fathoms of webbing.

There were 2,184 gill nets used, or an aggregate length of 133,260 fathoms, an increase of 192 nets but a decrease of 31,820 fathoms of webbing. Two driven traps—the same number as in the two preceding years—were operated.

Seines caught 26 per cent of the salmon taken in 1930, gill nets 11 per cent, and traps 61 per cent, while lines and wheels took the remaining 2 per cent.

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1929	1930	1929	1930	1929	1930
Seines	23	27	38	30	7	5
Gill nets	2	2	7	10	89	87
Traps	72	69	55	60	1	1
Lines	3	2				
Wheels					3	7

Salmon taken in 1930, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver	173, 081	143, 677	23	316, 781
Chum, or keta	1, 089, 056	1, 047, 614	23, 700	2, 160, 370
Pink, or humpback	11, 866, 524	6, 150, 178	82, 925	18, 099, 627
King, or spring	978	1, 462	6, 740	9, 180
Red, or sockeye	680, 644	186, 455	192, 898	1, 059, 997
Total	13, 810, 283	7, 529, 386	306, 286	21, 645, 955
Gill nets:				
Coho, or silver	279, 804	823, 201	39, 976	1, 142, 981
Chum, or keta	64, 252	78, 272	762, 436	904, 960
Pink, or humpback	135, 254	196, 931	251, 241	583, 426
King, or spring	23, 671	52, 132	121, 602	197, 405
Red, or sockeye	477, 231	1, 192, 798	4, 601, 008	6, 271, 037
Total	980, 212	2, 343, 334	5, 776, 263	9, 099, 809
Traps:				
Coho, or silver	909, 805	736, 542		1, 646, 347
Chum, or keta	1, 555, 196	1, 688, 296	6, 962	3, 250, 454
Pink, or humpback	31, 481, 454	10, 239, 494		41, 720, 948
King, or spring	9, 403	65, 959	648	76, 010
Red, or sockeye	1, 429, 564	2, 115, 821	29, 106	3, 574, 491
Total	35, 385, 422	14, 846, 112	36, 716	50, 268, 250
Lines:				
Coho, or silver	635, 817	21, 417		657, 234
King, or spring	575, 952	32		575, 984
Total	1, 211, 769	21, 449		1, 233, 218
Wheels:				
Coho, or silver			155, 100	155, 100
Chum, or keta			305, 000	305, 000
King, or spring			34, 300	34, 300
Total			494, 400	494, 400
Total:				
Coho, or silver	1, 998, 507	1, 724, 837	195, 099	3, 918, 443
Chum, or keta	2, 708, 504	2, 814, 182	1, 098, 098	6, 620, 784
Pink, or humpback	43, 483, 232	16, 586, 603	334, 166	60, 404, 001
King, or spring	610, 004	119, 585	163, 290	892, 879
Red, or sockeye	2, 587, 439	3, 495, 074	4, 823, 012	10, 905, 525
Grand total	51, 387, 686	24, 740, 281	6, 613, 665	82, 741, 632

The total catch of salmon in 1930 was 82,741,632, an increase of 10,802,014, or 15 per cent, over the number taken in 1929. There was a gain of 23,186,893 in southeastern Alaska, while the central and western districts showed a falling off of 4,927,548 and 7,457,331, respectively. The catch by species shows that cohos increased 1,758,744, pinks 19,971,869, and kings 124,746, while reds decreased 8,279,486 and chums 2,773,859.

CANNING

CHANGES IN CANNERIES

The Alaska Pacific Fisheries bought the plant of Burnett Inlet Packing Co. and operated it during the season. The cannery of Far North Fisheries Co. at Hydaburg was leased to H. F. W. Kurth, formerly superintendent of the company, who carried on the business under the name of Kurth Fisheries. A new concern, Icy Straits Fisheries (Inc.), took over and operated the floating cannery *Resolute*, previously belonging to Mitkof Packing Co. The New England Fish Co. purchased the floating cannery *Retriever* from Red Salmon Packers Association and the plant was operated in the Yakutat district as in previous years. The Wrangell Narrows Packing Co. built a new cannery at Scow Bay to replace the plant at Mountain Point which was destroyed by fire in the fall of 1929. It was in readiness for operation by the opening of the season.

The Franklin Packing Co. plant at Port Ashton, which was leased to Alaska Pacific Salmon Corporation in 1929, was acquired and operated by the Shepard Point Packing Co. in 1930. The Pacific American Fisheries purchased and operated the cannery of Emel Packing Co. at Valdez. The cannery of the Alaska General Fisheries at Anchorage was sold to Farwest Fisheries (Inc.), which had formerly been engaged in the business only on Puget Sound. A new partnership, Gustan & Vogel, succeeded Gustan & Hartley at Point Possession. The name of the Kodiak Island Fishing & Packing Co. was changed to Uganik Fisheries (Inc.). The Alaska Packers Association purchased the properties of Crosby Fisheries (Inc.) on Zachar Bay, including the floating cannery *Salmon King*. The vessel was transferred to California in the spring and the traps and other fishing gear were operated in connection with the company's Larsen Bay plant. The Kenai River Packing Co. operated its cannery at Kenai, which had been idle in 1929.

The International Packing Co. sent its floating plant *International* to pack salmon in Kuskokwim Bay, where commercial fishing was permitted for the first time since 1925. Operations there were not very successful, however, and the vessel left before the season was over to resume activities at Makushin Bay and later at Fox Bay.

NEW CANNERIES

A new concern, the Port Williams Packing Co., took over the herring saltery formerly operated by S. Sklaroff & Son on Shuyak Island and converted it into a modern 1-line salmon cannery, which was in operation during the season. A. N. Nilson, of Portlock, and Wik & Berg, of Redoubt Bay, who prepared small packs of salmon in 1929, engaged in the business more extensively this year and are included in the list of canneries, the partnership being under the name of the Redoubt Bay Packing Co. The Anvil Sea Food Corporation equipped the motorship *Anvil* with a canning line and operated at Port Heiden.

CANNERIES NOT OPERATED

Twelve plants that had been engaged in canning salmon the preceding year were not operated in 1930. In southeastern Alaska the plant formerly operated by the Alaska Associated Canneries at Point Warde has been dismantled, and the plant of the Starr-Collinson Packing Co. at Moira Sound, which was destroyed by fire in August, 1929, was not rebuilt. Canneries that were closed in central Alaska included that of Jake Young at Port Chatham, the Arctic Packing Co. at Port Graham, the Sunset Packing Co. at Otter Creek, and the floating plants *Costa Rica*, of the Union Fish Co., and the *Salmon King*, formerly owned by the Crosby Fisheries (Inc.). It is not likely that these floating plants will be used again in the salmon-canning business in Alaska. The hand cannery of the Blue Island Packing Co. at Blue Fox Bay has been listed also among the plants not operated as only a small pack was prepared there in the fall from a catch that could not be delivered to another company because of unfavorable weather. Four plants in the Bristol Bay district were not operated—the Kvichak (X) and the Naknek (O) canneries of Alaska Packers Association; Libby, McNeill & Libby's cannery at Libbyville; and the Ugashik cannery of the Red Salmon Canning Co.

Several plants have been dropped from the list of inactive canneries, as follows: Kodiak Island Fishing & Packing Co.'s plant at Seward; the plant of the Northwestern Fisheries Co. at Seldovia, which has been used as a herring saltery by various concerns in recent years; and the Alaska Pacific Salmon Corporation's plant at Yes Bay and the Gorman & Co.'s plant at Anchorage, which have been dismantled.

The following canneries were closed during the year but may be reopened:

Southeastern Alaska:	
Alaska Pacific Salmon Corporation	Boca de Quadra. Pybus Bay. Tenakee.
Alaska Packers Association	Wrangell.
Alaska Sanitary Packing Co	Cape Fanshaw.
Hoonah Packing Co	Hoonah. Gambier Bay.
The Nakat Packing Corporation	Heceta Island.
Northwestern Fisheries Co	Santa Ana.
Pacific American Fisheries	Port Walter.
Central Alaska:	
Alaska Packers Association	Kasilof.
Blue Island Packing Co	Blue Fox Bay.
W. G. Culver	Point McManus.
Pacific American Fisheries	Bering River. Unakwik Inlet.
Sunset Packing Co	Otter Creek.
Jake Young	Port Chatham.
Western Alaska:	
Alaska Packers Association	Kvichak Bay. Naknek River.
Alaska Salmon Co	Kvichak Bay.
Libby, McNeill & Libby	Libbyville.
Red Salmon Canning Co	Ugashik River.

TOTAL CANNERIES OPERATED

There were 149 canneries operated in Alaska in 1930—57 in southeastern, 66 in central, and 26 in western, which is 2 less each in southeastern and central and 3 less in the western district than in 1929, a net decrease of 7 plants. The Alaska Fishermen's Cooperative Packing Co. operated its floating cannery *Santa Flavia* in both the central and western districts, and the International Packing Co.'s floating plant *International* was also operated in those two districts, but each is included but once in the total, the former being credited to central and the latter to western Alaska.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1930

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
Alaska Pacific Fisheries	1	Burnett Inlet		8	8
Alaska Pacific Salmon Corporation	6	Chomly	5	6	11
		Funter Bay	2	19	21
		Kake	1	14	15
		Ketchikan	3	11	14
		Port Althorp		14	14
		Rose Inlet		8	8
Alaska Packers Association	1	Loring	3	4	7
Annette Island Packing Co	1	Metlakatla	5	3	8
Astoria & Puget Sound Canning Co	1	Excursion Inlet	1	7	8
Bayview Packing Co	1	Klawak			
Beegle Packing Co	1	Ketchikan	1	2	3
Columbia River Packers Association	1	Lake Bay		7	7
Demmert Packing Co	1	Klawak		5	5
Diamond K. Packing Co	1	Wrangell (floating)		5	5
Douglas Island Packing Co	1	Douglas			
Fidalgo Island Packing Co	2	Bay of Pillars	7		7
		Ketchikan	3	4	7
Haines Packing Co	1	Letnikof Cove			
P. E. Harris & Co	1	Hawk Inlet		7	7
Hetta Packing Co. (Inc.)	1	Coppermount			
Hood Bay Canning Co	1	Hood Bay		6	6
Icy Straits Fisheries (Inc.)	1	Hoonah (floating)			
Independent Salmon Canneries (Inc.)	1	Ketchikan			
Iwersen Packing Co	1	do			
Kurth Fisheries	1	Hydaburg		2	2
Libby, McNeill & Libby	6	Craig		8	8
		George Inlet		9	9
		Karheen	1	5	6
		Klawak		4	4
		Taku Harbor	7	7	14
		Yakutat			
Nakat Packing Corporation, The	4	Hidden Inlet		5	5
		Ketchikan		7	7
		Union Bay		8	8
		Waterfall		14	14
New England Fish Co	4	Chatham	2	8	10
		Ketchikan		7	7
		Noyes Island		7	7
		Yakutat (floating)			
Northwestern Fisheries Co	5	Boca de Quadra	5	3	8
		Dundas Bay		4	4
		Hunter Bay		5	5
		Kasaan	2	10	12
		Shakan		7	7
Pacific American Fisheries	2	Excursion Inlet	5	5	10
		Ketchikan	2	5	7
Peril Straits Packing Co	1	Todd		7	7
Petersburg Packing Co	1	Petersburg	4	8	12
Pyramid Packing Co. (Inc.)	1	Sitka		5	5
Sebastian-Stuart Fish Co	1	Tyee		7	7
Straits Packing Co	1	Skowl Arm		2	2
Stuart Corporation, The	1	Ketchikan		4	4
Superior Packing Co	1	Tenakee		5	5
Ward's Cove Packing Co	1	Ward Cove		3	3
Wrangell Narrows Packing Co	1	Scow Bay			
Wrangell Packing Corporation	1	Wrangell		3	3

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1930—Continued

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Central Alaska:					
Alaska Fishermen's Cooperative Packing Co.	1	Unga Island (floating)	----	----	--
Alaska Pacific Salmon Corporation	1	Drier Bay	--	4	4
Alaska Packers Association	3	Alitak	4	----	4
		Chignik	1	----	1
		Karluk	9	----	9
Alaska Year-Round Canneries Co	1	Seldovia	----	6	6
Alitak Fish Co	2	Alitak	4	----	4
		Zachar Bay	3	----	3
Anderson Mercantile Co. (Inc.)	1	Deep Creek	2	----	2
Columbia River Packers Association	1	Chignik	4	----	4
Cook Inlet Packing Co	1	Seldovia	7	----	7
Copper River Packing Co	1	McClure Bay	----	8	8
Cordova Packing Co	1	Cordova	1	----	1
H. J. Emard	1	Anchorage	3	----	3
Everett Packing Co	1	Popof Strait (floating)	----	----	----
Farwest Fisheries, Inc	1	Anchorage	5	----	5
Fidalgo Island Packing Co	1	Port Graham	8	----	8
Glacier Packing Co	1	Cordova (floating)	----	----	----
Grimes Packing Co	1	Uzinki	1	----	1
Gustan & Vogel	1	Point Possession	2	----	2
P. E. Harris & Co	1	False Pass	8	----	8
International Packing Co	1	Fox Bay (floating)	----	----	----
Kadiak Fisheries Co	2	Kodiak	9	----	9
		Shearwater Bay	1	----	1
Katmai Packing Co	1	Uzinki	3	----	3
Kenai River Packing Co	1	Kenai	5	----	5
Kustatan Packing Co	1	Kustatan	----	----	----
Libby, McNeill & Libby	1	Kenai	19	----	19
New England Fish Co	2	Cordova	4	4	8
		Drier Bay	----	----	----
Ninilchik Packing Co	1	Ninilchik	1	----	1
A. N. Nilson	1	Portlock*	----	----	----
North Coast Packing Co	1	Ninilchik	5	----	5
North Pacific Fisheries (Inc.)	1	Uyak Bay (floating)	----	----	----
Northern Light Packing Co	1	Mountain Slough	----	----	----
Northwestern Fisheries Co	4	Chignik	1	----	1
		Kenai	10	----	10
		Orca	----	6	6
		Uyak	1	----	1
Pacific American Fisheries	3	Ikatan	5	----	5
		King Cove	14	----	14
		Valdez	4	----	4
Charles W. Pajoman	1	Iron Creek	----	----	----
Pioneer Packing Co	1	Cordova	2	2	4
Pioneer Sea Foods Co	1	do	----	2	2
Point Possession Fish Co	1	Point Possession	----	----	----
Port Williams Packing Corporation	1	Port Williams*	----	----	----
Premier Salmon Co	1	Orca Bay	2	1	3
Redoubt Bay Packing Co	1	Redoubt Bay*	----	----	----
E. Sandvik	1	Swansons Creek	----	----	----
San Juan Fishing & Packing Co	3	Evans Bay	3	2	5
		Tutka Bay	7	----	7
		Uganik Bay	7	----	7
Seashore Packing Co	1	Kukak Bay	----	----	----
Seward Fisheries (Inc.)	1	Seward	----	----	----
Shelikof Packing Co	1	Zachar Bay	----	----	----
Shepard Point Packing Co	2	Port Ashton	----	7	7
		Shepard Point	----	5	5
Shumagin Packing Co	1	Squaw Harbor	2	----	2
Harvey J. Smith	1	West Foreland	----	----	----
Snug Harbor Packing Co	1	Snug Harbor	9	----	9
Spur Fish Corporation	1	Nikishka Bay	1	----	1
J. F. Toman Packing Co	1	Anchorage	1	----	1
Trinity Packing Co	1	Three Saints Bay	----	----	----
Uganik Fisheries (Inc.)	1	Uganik	6	----	6
West Coast Canning Co	1	Tuxedna Bay	----	----	----
John Wik	1	Kenai	1	----	1
Western Alaska:					
Alaska Fishermen's Cooperative Packing Co.	1	Nushagak River (floating).	----	----	----
Alaska Packers Association	7	Egegik River	----	----	----
		Kvichak Bay	----	----	----
		Naknek River (2)	----	----	----
		Nushagak Bay (2)	----	----	----
		Ugashik River	----	----	----
Alaska-Portland Packers Association	2	Naknek River	----	----	----
		Nushagak Bay	----	----	----

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1930—Continued

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Wertern Alaska—Continued.					
Alaska Salmon Co	1	Wood River			
Anvil Sea Food Corporation	1	Port Heiden (floating)*			
Bristol Bay Packing Co	1	Kvichak Bay			
Columbia River Packers Association	1	Nushagak Bay			
Herendeen Bay Consolidated Canneries	1	Herendeen Bay			
International Packing Co	1	Kuskokwim Bay and Makushin Bay (floating).			
Libby, McNeill & Libby	5	Egegik River			
		Ekuk			
		Koggiung			
		Lockanok			
		Nushagak			
Nakat Packing Corporation, The	1	Nakeen			
Northwestern Fisheries Co	2	Naknek River			
		Nushagak			
Pacific American Fisheries	1	Port Moller	2		2
Red Salmon Canning Co	2	Naknek River (2)			

LOSSES AND DISASTERS

The total amount of reported property losses in the salmon-canning business for 1930 was $313,748, including the damage by storm to plants in the Bristol Bay district in the latter part of November, 1929, which entailed a loss in excess of $150,000. In southeastern Alaska there were lost the steam cannery tender *Anna Barron*, gas boats *Twin B* and *Clara Blanche*, bunk houses, miscellaneous fishing equipment and small boats, having an aggregate value of $73,124. Losses in central Alaska comprised the gas boats *Bol*, *Sunset*, *Go-Get*, and *Owl*, several small boats, a cannery dock, and miscellaneous fishing equipment to the value of $41,813. The total loss in the western district amounted to $198,811 and consisted chiefly of buildings and equipment, docks, and small boats.

Twenty-nine lives were lost—6 in southeast Alaska, 10 in central, and 13 in western Alaska. In the southeastern district 1 fisherman and 2 shoresmen died of disease, 1 shoresman met death by accident, and 2 transporters were drowned. Four fishermen and 1 transporter were drowned in central Alaska; 4 shoresmen died of disease, and 1 transporter was killed by accident. In western Alaska 1 fisherman and 11 shoresmen died of disease and 1 transporter was drowned.

STATISTICS

In 1930, 149 canneries were operated in Alaska, 7 less than in 1929. Employment was given to 22,324 persons, as compared with 24,271 in 1929, a decrease of 1,947. White employees decreased 823, natives 448, Chinese 188, Japanese 116, Mexicans 453, Kanakas 20, Porto Ricans 19, negroes 55, and miscellaneous 13, while Filipinos increased 188.

The total pack of canned salmon was 5,032,326 cases, valued at $29,694,898. This was a decrease of 337,833 cases, or about 6 per cent, from the pack of 1929 and a decrease in value of $10,774,487, or about 27 per cent. The output in southeastern Alaska increased from

2,101,211 cases to 2,977,286 cases, or about 42 per cent, while there was a decrease in central Alaska from 2,084,503 cases to 1,618,545 cases, or 22 per cent, and in western Alaska from 1,184,445 cases to 436,495, or about 63 per cent. In Alaska as a whole the pack of cohos increased from 171,956 cases to 332,422 cases, or 93 per cent, and pinks increased from 2,571,657 cases to 3,188,534 cases, or 24 per cent; while chums decreased from 864,512 cases to 599,934, or about 31 per cent; kings from 72,107 cases to 59,922, or 17 per cent; and reds from 1,689,927 cases to 851,514 cases, or about 50 per cent.

Data are included in the following tables to show comparison of the 1930 pack with the average for the five preceding years, 1925 to 1929, by cases of each species and by districts. Three species—cohos, pinks, and kings—show a gain in 1930 over the 5-year average, while chums and reds show a decline. By districts, the pack in southeastern Alaska increased 24 per cent, while in central and western Alaska there were decreases of 5 per cent and 61 per cent, respectively, making a net decrease for all of Alaska of nearly 4 per cent from the 5-year average.

For the first time in Alaska, a pack of salmon in quarter-pound cans was prepared at one of the plants in the southeastern district. The pack consisted of approximately 2,000 cases each of reds and cohos, and 6,000 cases of pinks, each case containing 36 cans. In the following tables the pack has been converted to "standard cases" of 48 1-pound cans to the case.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1930

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	1, 109	1, 590	1, 613	4, 312
Natives	1, 255	562	156	1, 973
Chinese	1		1	2
Japanese	1			1
Filipinos	14	1		15
Mexicans	5			5
Negro	1			1
Total	2, 386	2, 153	1, 770	6, 309
Shoresmen:				
Whites	2, 065	1, 515	1, 686	5, 266
Natives	1, 202	467	138	1, 807
Chinese	208	269	280	757
Japanese	543	445	234	1, 222
Filipinos	2, 037	1, 303	853	4, 193
Mexicans	13	97	611	721
Kanakas	16	4	11	31
Porto Ricans		3	18	21
Negroes	1	16	72	89
Miscellaneous [1]		1	27	28
Total	6, 085	4, 120	3, 930	14, 135
Transporters:				
Whites	869	610	292	1, 771
Natives	40	44	1	85
Chinese	2	8		10
Japanese	6	4		10
Filipinos	2			2
Mexican	1			1
Miscellaneous [1]	1			1
Total	921	666	293	1, 880

[1] Koreans, Peruvians, etc.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1930—Continued

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
Total:				
Whites	4, 043	3, 715	3, 591	11, 349
Natives	2, 497	1, 073	295	3, 865
Chinese	211	277	281	769
Japanese	550	449	234	1, 233
Filipinos	2, 053	1, 304	853	4, 210
Mexicans	19	97	611	727
Kanakas	16	4	11	31
Porto Ricans		3	18	21
Negroes	2	16	72	90
Miscellaneous [1]	1	1	27	29
Grand total	9, 392	6, 939	5, 993	22, 324
Wages paid shoresmen	$2, 435, 444	$1, 963, 361	$1, 488, 479	$5, 887, 284
Wages paid transporters	$464, 169	$394, 212	$126, 893	$985, 274
OPERATING UNITS				
Plants:				
Shore canneries	54	62	24	140
Floating canneries—				
Power vessels	2	3	2	7
Net tonnage	301	3, 153	1, 976	5, 430
Barges	1	1		2
Net tonnage	488	389		877
Total plants operated	57	66	26	149
Vessels:				
Power, over 5 tons	455	200	91	746
Net tonnage	9, 064	8, 689	32, 727	50, 480
Sailing		1		1
Net tonnage		1, 590		1, 590
Launches	119	232	25	376
Power dories	30	49	1	80
Gill-net boats	116	156	854	1, 126
Seine skiffs	137	256	16	409
Other rowboats and skiffs	1, 105	803	133	2, 041
Lighters and scows	273	292	134	699
Houseboats	26	5	37	68
Pile drivers	44	48	17	109
Pile pullers	13	5		18
Rigging scows	40	17		57
Apparatus:				
Purse seines	416	178	14	608
Fathoms	72, 839	17, 390	3, 425	93, 654
Beach seines	5	160	7	172
Fathoms	500	20, 453	465	21, 418
Gill nets	353	2, 453	[2] 1, 237	4, 043
Fathoms	20, 985	116, 480	118, 450	255, 915
Traps, driven	63	213	2	278
Traps, floating	381	42		423

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[1] Koreans, Peruvians, etc.

[2] Includes 134 stake nets of an average length of 25 fathoms each, used in the Bristol Bay area.

Output and value of canned salmon in Alaska in 1930 [1]

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho, or silver:								
¼-pound flat	371	$5, 643					371	$5, 643
½-pound flat	5, 947	68, 515	12, 861	$121, 460			18, 808	189, 975
1-pound flat	5, 768	53, 347	158	1, 327			5, 926	54, 674
1-pound tall	143, 566	1, 243, 698	160, 333	1, 220, 055	3, 418	$30, 979	307, 317	2, 494, 732
Total	155, 652	1, 371, 203	173, 352	1, 342, 842	3, 418	30, 979	332, 422	2, 745, 024
Chum, or keta:								
½-pound flat	5, 883	32, 992	2, 501	13, 792			8, 384	46, 784
1-pound tall	277, 595	992, 989	282, 250	1, 009, 351	31, 705	113, 000	591, 550	2, 115, 340
Total	283, 478	1, 025, 981	284, 751	1, 023, 143	31, 705	113, 000	599, 934	2, 162, 124
Pink, or humpback:								
¼-pound flat	1, 113	11, 581					1, 113	11, 581
½-pound flat	75, 036	494, 141	6, 028	36, 006			81, 064	530, 147
1-pound flat	3, 647	17, 538			1, 220	4, 383	4, 867	21, 921
1-pound tall	2, 230, 180	9, 255, 381	853, 733	3, 399, 277	17, 577	70, 114	3, 101, 490	12, 724, 772
Total	2, 309, 976	9, 778, 641	859, 761	3, 435, 283	18, 797	74, 497	3, 188, 534	13, 288, 421
King, or spring:								
½-pound flat	2, 581	48, 201	13, 521	209, 602	1, 738	31, 426	17, 840	289, 229
1-pound flat	2, 917	46, 672	9, 884	138, 756	10, 885	144, 740	23, 686	330, 168
1-pound tall	1, 441	13, 265	8, 655	82, 441	8, 300	83, 185	18, 396	178, 891
Total	6, 939	108, 138	32, 060	430, 799	20, 923	259, 351	59, 922	798, 288
Red, or sockeye:								
¼-pound flat	370	8, 883					370	8, 883
½-pound flat	42, 159	691, 637	53, 056	837, 467	15, 390	234, 227	110, 605	1, 763, 331
1-pound flat	35, 927	464, 190	22, 247	264, 604	4, 798	57, 602	62, 972	786, 396
1-pound tall	142, 785	1, 725, 461	193, 318	2, 290, 096	341, 464	4, 126, 874	677, 567	8, 142, 431
Total	221, 241	2, 890, 171	268, 621	3, 392, 167	361, 652	4, 418, 703	851, 514	10, 701, 041
Grand total	2, 977, 286	15, 174, 134	1, 618, 545	9, 624, 234	436, 495	4, 896, 530	5, 032, 326	29, 694, 898

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[1] For the purpose of affording fair comparison, cases containing ¼-pound and ½-pound cans have been reduced to the common basis of forty-eight 1-pound cans to the case.

Output of canned salmon in Alaska, in cases, 1925 to 1930 [1]

BY SPECIES

Product	1925	1926	1927	1928	1929	Average for 5-year period, 1925–1929	1930	Percentage of increase or decrease in 1930, as compared with 5-year average
Coho, or silver:								
¼-pound flat							371	
½-pound flat	7, 145	10, 354	10, 105	13, 498	7, 880	9, 796	18, 808	+92. 00
1-pound flat	7, 223	16, 625	15, 047	5, 840	6, 730	10, 293	5, 926	−42. 42
1-pound tall	146, 642	175, 548	227, 892	279, 285	157, 346	197, 343	307, 317	+55. 73
Total	161, 010	202, 527	253, 044	298, 623	171, 956	217, 432	332, 422	+52. 89
Chum, or keta:								
½-pound flat	3, 051	1, 367	9, 414	5, 057	4, 961	4, 770	8, 384	+75. 77
1-pound flat		48, 982	1, 449	4		10, 087		−100. 00
1-pound tall	1, 075, 629	852, 094	496, 860	990, 724	859, 551	854, 972	591, 550	−30. 81
Total	1, 078, 680	902, 443	507, 723	995, 785	864, 512	869, 829	599, 934	−31. 03

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[1] The number of cases shown has been put upon the common basis of forty-eight 1-pound cans per case.

Output of canned salmon in Alaska, in cases, 1925 to 1930 —Continued

BY SPECIES

Product	1925	1926	1927	1928	1929	Average for 5-year period, 1925–1929	1930	Percentage of increase or decrease in 1930, as compared with 5-year average
Pink, or humpback:								
¼-pound flat	----------	----------	----------	----------	----------	----------	1, 113	----------
½-pound flat	34, 005	59, 835	50, 455	40, 473	44, 762	45, 906	81, 064	+76. 59
1-pound flat	185	82, 161	14, 662	6, 189	3, 910	21, 421	4, 867	−77. 28
1-pound tall	2, 076, 403	3, 196, 353	1, 355, 658	2, 740, 580	2, 522, 985	2, 378, 396	3, 101, 490	+30. 40
Total	2, 110, 593	3, 338, 349	1, 420, 775	2, 787, 242	2, 571, 657	2, 445, 723	3, 188, 534	+30. 37
King, or spring:								
½-pound flat	2, 755	3, 324	10, 528	11, 782	16, 320	8, 942	17, 840	+99. 51
1-pound flat	8, 828	11, 125	11, 371	14, 854	26, 808	14, 597	23, 686	+62. 27
1-pound tall	38, 395	38, 027	48, 492	27, 523	28, 979	36, 283	18, 396	−49. 30
Total	49, 978	52, 476	70, 391	54, 159	72, 107	59, 822	59, 922	+0. 17
Red, or sockeye:								
¼-pound flat	----------	----------	----------	----------	----------	----------	370	----------
½-pound flat	68, 901	82, 181	88, 874	89, 063	100, 136	85, 831	110, 605	+28. 86
1-pound flat	28, 757	104, 329	57, 771	87, 100	75, 326	70, 657	62, 972	−10. 88
1-pound tall	962, 018	1, 970, 577	1, 173, 550	1, 771, 931	1, 514, 465	1, 478, 508	677, 567	−54. 17
Total	1, 059, 676	2, 157, 087	1, 320, 195	1, 948, 094	1, 689, 927	1, 634, 996	851, 514	−47. 92
Grand total	4, 459, 937	6, 652, 882	3, 572, 128	6, 083, 903	5, 370, 159	5, 227, 802	5, 032, 326	−3. 74

BY DISTRICTS AND SPECIES

Southeast Alaska:								
Coho, or silver	91, 352	96, 389	114, 970	145, 770	97, 847	109, 266	155, 652	+42. 45
Chum, or keta	847, 913	618, 397	224, 433	570, 219	290, 797	510, 352	283, 478	−44. 45
Pink, or humpback	1, 707, 456	2, 158, 699	588, 291	2, 142, 838	1, 542, 615	1, 627, 980	2, 309, 976	+41. 89
King, or spring	12, 005	10, 679	8, 031	5, 522	7, 000	8, 647	6, 939	−19. 75
Red, or sockeye	143, 688	173, 891	116, 468	106, 798	162, 952	140, 759	221, 241	+57. 18
Total	2, 802, 414	3, 058, 055	1, 052, 193	2, 971, 147	2, 101, 211	2, 397, 004	2, 977, 286	+24. 21
Central Alaska:								
Coho, or silver	68, 289	104, 309	138, 034	152, 360	71, 330	106, 864	173, 352	+62. 22
Chum, or keta	200, 274	243, 808	253, 197	377, 857	497, 774	314, 582	284, 751	−9. 48
Pink, or humpback	402, 992	1, 144, 180	817, 538	643, 330	1, 025, 652	806, 739	859, 761	+6. 57
King, or spring	19, 300	23, 683	43, 470	35, 036	35, 661	31, 430	32, 060	+2. 00
Red, or sockeye	361, 738	630, 505	318, 864	430, 572	454, 086	439, 153	268, 621	−38. 83
Total	1, 052, 593	2, 146, 485	1, 571, 103	1, 639, 155	2, 084, 503	1, 698, 768	1, 618, 545	−4. 72
Western Alaska:								
Coho, or silver	1, 369	1, 829	40	493	2, 779	1, 302	3, 418	+162. 52
Chum, or keta	30, 493	40, 238	30, 093	47, 709	75, 941	44, 895	31, 705	−29. 38
Pink, or humpback	145	35, 470	14, 946	1, 074	3, 390	11, 005	18, 797	+70. 80
King, or spring	18, 673	18, 114	18, 890	13, 601	29, 446	19, 745	20, 923	+5. 97
Red, or sockeye	554, 250	1, 352, 691	884, 863	1, 410, 724	1, 072, 889	1, 055, 083	361, 652	−65. 72
Total	604, 930	1, 448, 342	948, 832	1, 473, 601	1, 184, 445	1, 132, 030	436, 495	−61. 44
Grand total	4, 459, 937	6, 652, 882	3, 572, 128	6, 083, 903	5, 370, 159	5, 227, 802	5, 032, 326	−3. 74

Relative importance of each species of canned salmon within each district in 1930

District	Coho	Chum	Pink	King	Red	Total, all species
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Southeast Alaska	5. 2	9. 5	77. 6	0. 3	7. 4	100. 0
Central Alaska	10. 7	17. 6	53. 1	2. 0	16. 6	100. 0
Western Alaska	. 8	7. 3	4. 3	4. 8	82. 8	100. 0
All Alaska	6. 6	11. 9	63. 4	1. 2	16. 9	100. 0

Relative importance of each district in the production of each species of salmon canned in 1930

District	Coho	Chum	Pink	King	Red	Total, all species
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Southeast Alaska	46. 8	47. 2	72. 4	11. 6	26. 0	59. 2
Central Alaska	52. 2	47. 5	27. 0	53. 5	31. 5	32. 1
Western Alaska	1. 0	5. 3	0. 6	34. 9	42. 5	8. 7
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0

Average annual price per case of forty-eight 1-pound cans of salmon, 1920 to 1930

Product	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Coho, or silver	$9. 13	$5. 63	$5. 47	$5. 74	$6. 83	$9. 72	$8. 40	$8. 51	$7. 12	$7. 59	$8. 26
Chum, or keta	4. 19	3. 68	3. 98	4. 65	4. 68	4. 44	5. 01	5. 47	6. 06	5. 35	3. 60
Pink, or humpback	5. 47	4. 21	4. 34	4. 86	4. 93	5. 28	5. 39	5. 87	6. 56	6. 06	4. 17
King, or spring	10. 97	10. 22	8. 08	8. 56	8. 89	11. 91	10. 37	11. 25	11. 13	11. 92	13. 32
Red, or sockeye	13. 05	8. 96	9. 24	9. 27	9. 53	13. 12	9. 89	12. 08	9. 41	10. 71	12. 57

PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1929. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

WESTERN ALASKA

Bristol Bay.—The Bering Sea shore, east and north of the Ugashik River.

Port Moller and Herendeen Bay.—Port Moller, Herendeen Bay, and Nelson Lagoon.

CENTRAL ALASKA

Ikatan-Shumagin Islands.—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.

Chignik.—Canneries located at Chignik.

Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.

Cook Inlet.—The shores of Cook Inlet.

Prince William Sound.—Extends from Resurrection Bay to Point Whitshed.

Copper and Bering Rivers.—Extends from Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

Yakutat and Dry Bay.—Extends from Yakutat Bay to and including Dry Bay.

Icy Strait-Lynn Canal.—West coast of Baranof and Chichagof Islands, the shores of Cross Sound, Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.

Chatham Strait-Frederick Sound.—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.

Sumner Strait-Dixon Entrance.—Extends southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance, and includes all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.

West coast, Prince of Wales Island.—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

Pack of canned salmon in Alaska in 1930, by districts [1]

District	Coho	Chum	Pink	King	Red	Total	Percentage of increase or decrease from 1929
	Cases	*Cases*	*Cases*	*Cases*	*Cases*	*Cases*	
Bristol Bay	3, 415	22, 032	14, 631	19, 892	348, 762	408, 732	−62. 40
Port Moller and Herendeen Bay		9, 483		1, 031	12, 890	23, 404	−74. 65
Ikatan-Shumagin Islands	16, 191	129, 362	315, 957	2, 922	71, 885	536, 317	+25. 01
Chignik	1, 781	5, 105	3, 500	58	2, 745	13, 189	−90. 52
Kodiak-Afognak Islands	22, 995	42, 410	85, 609	1, 338	35, 850	188, 202	−63. 72
Cook Inlet	50, 098	10, 084	53, 016	19, 388	70, 552	203, 138	+26. 51
Prince William Sound	11, 958	97, 980	405, 845	627	17, 259	533, 669	−26. 26
Copper and Bering Rivers	70, 332			7, 727	70, 330	148, 389	+25. 45
Yakutat and Dry Bay	33, 703	308	6, 229	2, 917	29, 858	73, 015	+40. 87
Icy Strait-Lynn Canal	22, 773	95, 381	708, 853	1, 761	108, 191	936, 959	+89. 79
Chatham Strait-Frederick Sound	17, 397	86, 638	467, 680	581	17, 529	589, 825	+44. 65
Sumner Strait-Dixon Entrance	51, 534	67, 919	852, 392	356	50, 037	1, 022, 238	+24. 76
West Coast, Prince of Wales Island	30, 245	33, 232	274, 822	1, 324	15, 626	355, 249	+8. 13
Total	332, 422	599, 934	3, 188, 534	59, 922	851, 514	5, 032, 326	−6. 29

[1] Pack reduced to the basis of forty-eight 1-pound cans per case.

MILD CURING

Although unusually abundant runs of king and coho salmon augured well for the mild-curing business in 1930, poor market conditions with continued declining prices resulted in the curtailment of operations, especially in the fall season. While there was a decrease of but 2 per cent in the quantity produced, as compared with that of the preceding year, the value showed a decline of 30 per cent.

The number of plants operated increased from 17 in 1929 to 20 in 1930. Of these, 18 were in southeastern and 2 in central Alaska. An enumeration of the trolling boats in southeastern Alaska was again undertaken by the bureau, but an unavoidable delay at the beginning of the season prevented a complete census. As it is reported that there were at least as many boats engaged in trolling in 1930 as there were in 1929, it has been deemed advisable to make use herein of the more complete figures obtained in the previous season.

Three trollers in southeast Alaska lost their lives—two by drowning and one by disease—and property losses included the gas boat *Eagle*, of the Cordova Mildcure Co., and damage to a number of boats that were sunk during a severe gale off Coronation Island, where they had taken shelter.

The total production of mild-cured salmon was 4,447,525 pounds valued at $868,722, a decrease of 99,675 pounds in quantity and $373,001 in value as compared with the output of 1929. The pack consisted of 344,450 pounds of cohos and 4,103,075 pounds of kings, or, in units of 800-pound tierces, 430 tierces of cohos and 5,129 tierces of kings.

FIGURE 3.—Salmon trolling boats, southeast Alaska

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1930

Item	Southeast Alaska	Central Alaska	Total
PERSONS ENGAGED			
Fishermen:			
Whites	807	-------	807
Natives	206	-------	206
Total	1,013	-------	1,013
Shoresmen:			
Whites	88	13	101
Natives	6	3	9
Total	94	16	110
Transporters:			
Whites	25	-------	25
Natives	2	-------	2
Total	27	-------	27
Grand total	1,134	16	1,150
Wages paid shoresmen	$73,357	$4,211	$77,568
Wages paid transporters	$19,745	-------	$19,745

Item	Southeast Alaska	Central Alaska	Total
OPERATING UNITS			
Plants:			
Shore	13	1	14
Floating—			
Barges	3	1	4
Net tonnage	720	240	960
Scows	2	-------	2
Total plants operated	18	2	20
Vessels:			
Power, over 5 tons	151	3	154
Net tonnage	1,307	22	1,329
Launches	597	1	598
Rowboats and skiffs	90	-------	90
Lighters and scows	2	-------	2
Houseboat	1	-------	1
Apparatus:			
Gill nets	-------	11	11
Fathoms	-------	550	550
Lines	3,386	6	3,392

Products of Alaska salmon mild-curing industry in 1930

Products	Southeast Alaska		Central Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	[1] 280,050	$31,484	[2] 64,400	$7,314	[3] 344,450	$38,798
King, or spring	[4] 4,043,875	818,896	[5] 59,200	11,028	[6] 4,103,075	829,924
Total	4,323,925	850,380	123,600	18,342	4,447,525	868,722

[1] 350 tierces. [2] 80 tierces. [3] 430 tierces. [4] 5,055 tierces. [5] 74 tierces. [6] 5,129 tierces.

PICKLING

Production of pickled salmon in western Alaska decreased sharply, due to the shortage of red salmon; and this district, which has heretofore led in the output of the commodity, produced less than one-third as much as central Alaska, where production almost doubled that of 1929, principally because the lack of demand for mild-cured cohos forced the operators to divert most of this species into the pickled product. In southeastern Alaska also the production nearly doubled that of the preceding year, the gain being chiefly in cohos, as in central Alaska, and traceable likewise to the small demand for this species in the mild-cure market. Despite the greatly reduced production in western Alaska the increases in the central and southeastern districts combined to bring the total output to a higher level than in any year since 1926.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1930

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	7	38	9	54
Natives	2	12	18	32
Total	9	50	27	86
Shoresmen:				
Whites		1	7	8
Natives		3	15	18
Total		4	22	26
Transporters:				
Whites	2			2
Grand total	11	54	49	114
Wages paid shoresmen		$185	$3, 517	$3, 702
Wages paid transporters	$210			$210
OPERATING UNITS				
Plants:				
Shore	2	3	4	9
Floating—				
Power vessels		2		2
Net tonnage		35		35
Total plants operated	2	5	4	11
Vessels:				
Power, over 5 tons	3	1	1	5
Net tonnage	66	7	40	113
Launches		8	3	11
Power dories	1	9		10
Gill-net boats	2	13	21	36
Seine skiffs		10		10
Row boats	1	10		11
Lighters and scows		2		2
Apparatus:				
Purse seines		1		1
Fathoms		100		100
Beach seines		15		15
Fathoms		1, 225		1, 225
Gill nets	8	91	28	127
Fathoms	380	2, 960	1, 900	5, 240
Wheels			2	2

The number of persons engaged in the industry in 1930 was 114—an increase of 18 over the previous year, and the number of plants operated increased from 7 to 11, of which 2 were in southeastern, 5 in central, and 4 in western Alaska. Production in southeastern

Alaska increased from 77,800 pounds in 1929 to 151,600 pounds in 1930, and in central Alaska from 272,300 pounds to 544,100 pounds. In western Alaska the production decreased from 331,300 pounds in 1929 to 167,250 pounds in 1930. The total output in 1930 was 862,950 pounds valued at $103,641; as compared with 681,400 pounds valued at $73,020 in 1929—an increase of approximately 27 per cent in quantity and 42 per cent in value.

Products of Alaska salmon-pickling industry in 1930

Species	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	98, 400	$9, 677	363, 000	$38, 589	2, 750	$413	464, 150	$48, 679
Chum, or keta	200	10	900	57	6, 000	431	7, 100	498
Pink, or humpback	26, 100	1, 753	16, 200	1, 202	----------	----------	42, 300	2, 955
King, or spring	4, 900	490	17, 200	2, 150	35, 100	4, 519	57, 200	7, 159
Red, or sockeye	22, 000	3, 327	146, 800	22, 394	123, 400	18, 629	292, 200	44, 350
Total	151, 600	15, 257	544, 100	64, 392	167, 250	23, 992	862, 950	103, 641

FRESH SALMON

The fresh-salmon business, which is largely incidental to the mild-curing of salmon, was on about the same scale as in the preceding year and was carried on only in southeast Alaska. One dealer, whose chief product was fresh salmon, gave employment to four white shoresmen. The total production was 1,295,216 pounds, valued at $117,620, against 1,212,012 pounds valued at $110,673 in 1929—an increase of approximately 7 per cent in quantity and 6 per cent in value.

Products of the Alaska fresh-salmon industry in 1930

Species	Pounds	Value
Coho, or silver	420, 149	$26, 064
Chum, or keta	3, 967	74
Pink, or humpback	3, 749	108
King, or spring	867, 351	91, 374
Total	1, 295, 216	117, 620

FREEZING

The freezing of salmon in 1930 was on a substantially larger scale than in the preceding year, the production exceeding even the former record output of 1928. This business is largely incidental to mild-curing and other branches of the fishery industry and is carried on principally in southeast Alaska, where six cold-storage plants are located. One company, whose chief output was frozen salmon, gave employment to 17 white shoresmen. The total output in 1930 was 6,614,206 pounds valued at $561,848, an increase of 50 per cent in quantity and 31 per cent in value over the production for 1929, when 4,395,169 pounds, valued at $428,618, were prepared.

Products of the frozen-salmon industry in 1930

Species	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	2,966,539	$214,573	10,800	$648			2,977,339	$215,221
Chum, or keta	573,575	23,509					573,575	23,509
Pink, or humpback	210,760	8,401			12,600	$680	223,360	9,081
King, or spring	2,839,879	314,033					2,839,879	314,033
Red, or sockeye	53	4					53	4
Total	6,590,806	560,520	10,800	648	12,600	680	6,614,206	561,848

DRY-SALTED, DRIED, SMOKED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

In southeastern Alaska one company prepared dry-salted cohos, and in central Alaska two firms dried a small quantity of salmon of various species, these operations being incidental to other lines of the industry. In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 1,590,000 pounds of salmon were dried, valued at $115,020; and in addition 500 pounds of kippered kings, valued at $100, and 456 pounds of beleke from kings, valued at $100, were prepared. In this western district 19 whites and 641 natives engaged in the fishery, and the apparatus used consisted of 264 wheels, 919 gill nets of 12,910 fathoms, 50 row boats and skiffs, and 4 gill-net boats.

An operator in the southeastern district put up a small quantity of salmon and steelhead trout smoked and packed in olive oil, giving employment to 2 white shoresmen and 1 Filipino. The output of salmon consisted of 90 cases of cohos and 9 cases of kings packed in ½-pound flat tins (48 to the case) valued at $891. One of the salmon canneries in that district canned 1,081 cases (forty-eight 1-pound tall cans to the case) of heads and eggs of various species of salmon for dog feed. This was an experimental pack, and whether any similar output will be prepared in the future depends upon the market for the product. Thirty-two cases of fish pudding from chum salmon packed in ½-pound cans (48 to the case), valued at $160, were prepared by one of the canneries in central Alaska.

Production of dry-salted, dried, smoked, and other miscellaneous salmon products in Alaska in 1930

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted:								
Coho, or silver	19,200	$2,400					19,200	$2,400
Dried:								
Coho, or silver					294,000	$29,400	294,000	29,400
Chum, or keta			1,075	$111	1,292,000	85,220	1,293,075	85,331
Pink, or humpback			1,025	154			1,025	154
King, or spring			1,500	300	4,000	400	5,500	700
Total			3,600	565	1,590,000	115,020	1,593,600	115,585
Smoked and packed in olive oil:								
Coho, or silver	2,160	810					2,160	810
King, or spring	216	81					216	81
Total	2,376	891					2,376	891
Kippered:								
King, or spring					500	100	500	100
Beleke:								
King, or spring					456	100	456	100
Fish pudding:								
Chum, or keta			768	160			768	160
Eggs and heads canned for dog feed	51,888	4,324					51,888	4,324
Grand total	73,464	7,615	4,368	725	1,590,956	115,220	1,668,788	123,560

BY-PRODUCTS

Two plants were engaged primarily in the preparation of salmon by-products in southeast Alaska, giving employment to 13 white shoresmen and 3 white transporters. In addition, two herring-reduction plants in that district and three salmon canneries in central Alaska manufactured salmon oil and fertilizer. The plant of the Alaska Reduction Co. near Ketchikan was to have been operated also, but it burned down at the beginning of the season and was not rebuilt until fall. The total production was 2,283,882 pounds of fertilizer, valued at $51,674, and 55,883 gallons of oil, valued at $10,525; as compared with 1,647,170 pounds of fertilizer, valued at $41,413, and 73,975 gallons of oil, valued at $29,893, in 1929—an increase of nearly 39 per cent in amount of fertilizer and a decrease of 24 per cent in quantity of oil.

Production of salmon oil and fertilizer in Alaska in 1930

District	Oil		Fertilizer	
	Gallons	Value	Pounds	Value
Southeast Alaska	51,868	$9,320	2,187,100	$49,254
Central Alaska	4,015	1,205	96,782	2,420
Total	55,883	10,525	2,283,882	51,674

HERRING

Notwithstanding continued economic depression and the consequently lower prices prevailing for oil, meal, and pickled fish, operations in the herring industry were on a somewhat larger scale than in the preceding year. However, the output of Scotch-cured herring, although showing a gain over that for 1929, was far below the average for the previous decade. The production of oil was the largest in the history of the industry, but the quantity of meal showed a decline from the record output of 1929. While the total quantity of herring products exceeded that of the preceding year by more than 1,500,000 pounds and the quality of the pickled product was generally better, the lower level of prices in 1930 resulted in a net decrease in value of some $660,000.

Herring were present in fair quantity in all of the principal fishing districts except Cook Inlet, where the commercial pack was a complete failure. Some prospecting was done there by two companies with seines in the summer and by gill-netters in the fall, but without success. During the summer fairly large schools of herring were observed at various places in the Cook Inlet district, but the fish were not suitable for pickling. In the Prince William Sound and Kodiak Island regions, herring were abundant, although many were of smaller size than is desirable for the best grade of Scotch-cure. There was a marked decline in the output in western Alaska, and that district, which in 1929 supplied nearly 77 per cent of the total pack of Scotch-cured herring in Alaska, produced approximately 46 per cent of the 1930 pack, as compared with 37 per cent from central and 17 per cent from southeastern Alaska.

Heavy runs of herring occurred in the Chatham Strait region of southeastern Alaska during the season, while in Stephens Passage there were far fewer fish than in previous years. An unusually large run of spawning herring appeared in the vicinity of Sitka in the early part of April. In accordance with their usual practice, natives collected large quantities of herring spawn on hemlock boughs in this region and shipped the commodity to Juneau, Haines, and other points. While there was reported a larger catch of bait herring than in previous years, some 425,000 pounds were imported from British Columbia by one of the cold-storage plants at Ketchikan.

Three floating plants were used in the herring industry—the motor ship *Donna Lane* and the schooner *Rosamond*, belonging to the Utopian Fisheries (Inc.) and the North American Fisheries, respectively, which operated in both the central and western districts, and the schooner *Alice Cooke*, purchased from the Aurora Fish Co. by the Kalgin Packing Co. and operated at Dutch Harbor. The barge *Fort Union*, which had formerly been operated as a herring-reduction plant by the Port Armstrong Herring Co. in southeast Alaska, sank at its mooring in Ship Cove, Baranof Island, during the winter of 1929–30. It was subsequently raised and sold for the salvage of lumber and other material.

As in previous years, the production of oil and meal centered chiefly in southeastern Alaska, where all but one of the plants engaged in this business prepared Scotch-cured herring also, the production of which increased from 1,244,250 pounds in 1929 to 1,382,895 pounds in 1930. The output of by-products in the southeastern district decreased from 23,872,093 pounds of meal and 3,120,307 gallons of oil in 1929, to 19,502,823 pounds of meal and 2,943,915 gallons of oil in 1930.

In central Alaska the production of Scotch-cured herring showed a decided increase, due to the abundance of fish in Prince William Sound and Kodiak Island waters, the pack amounting to 3,011,375 pounds, as compared with 200,250 pounds in 1929. The output of by-products also increased sharply, with a total of 3,908,200 pounds of meal and 601,507 gallons of oil in 1930, as compared with 1,627,161 pounds of meal and 220,872 gallons of oil in the preceding year.

A considerable decrease was manifested in the Scotch-cured pack of western Alaska in 1930, the production being 3,686,975 pounds, as against 5,100,625 pounds in 1929.

The number of plants handling herring in southeastern Alaska was 28, one more than in 1929. Of this number, five were cold-storage plants that froze herring for bait and seven engaged only in the production of herring for bait. The more important concerns engaged in the salting and reduction of herring in this district were as follows:

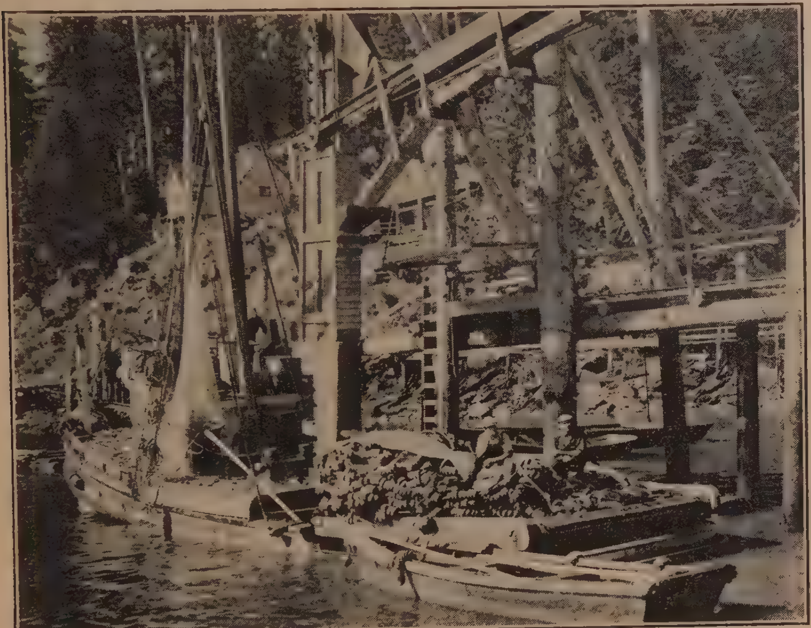

FIGURE 4.—Herring purse seine boat, showing elevator to convey fish to saltery, southeast Alaska

Reduction plant: Killisnoo Fisheries (Inc.)	Killisnoo.
Saltery: Ness Fish Co	Petersburg.
Saltery and reduction plants:	
Arentsen & Co	Big Port Walter.
Atlas Packing Corporation	Deep Cove.
Baranof Packing Co	Red Bluff Bay.
Buchan & Heinen Packing Co	Port Armstrong.
Chatham Strait Fish Co	New Port Walter.
Fidalgo Island Packing Co	Bay of Pillars.
Marine Packing & Reduction Co	Washington Bay.
Northwestern Herring Co	Port Conclusion.
Port Walter Herring & Packing Co	Saginaw Bay.
Storfold & Grondahl Packing Co	Washington Bay.
United States-Alaska Packing Co	Port Herbert. Warm Springs Bay.

Twelve operators in central Alaska were engaged in the pickling of herring, all of which, with the exception of a small pack at Chignik, was produced in the Prince William Sound and Kodiak areas. The larger operators in this district were as follows:

Salteries:	
Albert Coel	Shuyak Harbor.
Kadiak Fisheries Co	Shearwater Bay.
North American Fisheries (floating plant)	Red Fox Bay.
Trinity Packing Co	Three Saints Bay.
Utopian Fisheries (Inc.) (floating plant)	Sawmill Bay.
Saltery and reduction plants:	
Chatham Strait Fish Co	Crab Bay.
W. J. Imlach	Port Benny.
Johnson Fisheries	Thumb Bay.
San Juan Fishing & Packing Co	Evans Bay.

Of the following operators in the western Alaska district, all but three were engaged in the fishery at Dutch Harbor, producing principally Scotch-cured fish:

Austnes & Moberg	Unalaska.
Campbell & Dougal	Do.
Jordan Columbus	Dutch Harbor.
A. Conrad	Golovin Bay.
Golovin Bay Packing Co	Do.
Joe Harding	Do.
Ed Jacobsen & Co	Dutch Harbor.
Johnson & Peterson	Unalaska.
Kalgin Packing Co. (floating plant)	Dutch Harbor.
North American Fisheries (floating plant)	Do.
Polar Packing Co	Unalaska.
Rod & Aspeland	Do.
Utopian Fisheries (Inc.) (floating plant)	Dutch Harbor.

Property losses in the herring fishery consisted of seines and small boats having a total value of $12,380.

George A. Rounsefell, scientific assistant of the bureau, and one temporary assistant continued the investigations of the Alaska herring which have been in progress for the past several years.

STATISTICAL SUMMARY

The number of persons employed in the Alaska herring industry in 1930 was 1,413 as compared with 1,175 in 1929, and the number of plants increased from 30 to 39. Products of the fishery were valued at $2,133,677, as compared with $2,794,084 in 1929—a decrease of $660,407, or nearly 24 per cent. Scotch-cured herring increased from 6,545,125 pounds in 1929 to 8,081,245 pounds in 1930, or about 23 per cent, and herring for bait increased from 8,920,885 pounds to 9,298,140 pounds, or approximately 4 per cent. Meal decreased about 8 per cent in quantity and 11 per cent in value, and oil increased approximately 6 per cent in quantity but decreased 38 per cent in value, compared with the output of 1929.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1930

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	494	74	80	648
Natives	----------	3	34	37
Total	494	77	114	685
Shoresmen:				
Whites	448	94	107	649
Natives	4	13	51	68
Total	452	107	158	717
Transporters:				
Whites	3	----------	3	6
Natives	----------	----------	5	5
Total	3	----------	8	11
Grand total	949	184	280	1, 413
Wages paid shoresmen	$222, 358	$46, 229	$50, 003	$318, 590
Wages paid transporters	$596	----------	$6, 000	$6, 596
OPERATING UNITS				
Plants:				
Shore	14	6	16	36
Floating—				
Power vessel	----------	----------	1	1
Net tonnage	----------	----------	1, 597	1, 597
Sailing vessels	----------	----------	2	2
Net tonnage	----------	----------	1, 767	1, 767
Total plants operated	14	6	19	39
Vessels:				
Power, over 5 tons	75	13	10	98
Net tonnage	2, 433	269	203	2, 905
Launches	4	2	2	8
Power dories	----------	3	24	27
Gill-net boats	----------	----------	11	11
Seine skiffs	35	16	14	65
Other rowboats and skiffs	20	8	12	40
Lighters and scows	6	----------	1	7
Apparatus:				
Purse seines	73	13	8	94
Fathoms	12, 547	2, 105	1, 010	15, 662
Beach seines	----------	2	----------	2
Fathoms	----------	115	----------	115
Gill nets	----------	3	187	190
Fathoms	----------	125	9, 862	9, 987
Pound seines	13	12	2	27
Pounds	4	2	1	7

Products of Alaska herring industry in 1930

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait	2, 966, 255	$36, 609	273, 300	$4, 422	100, 625	$1, 006	3, 340, 180	$42, 037
Frozen, for bait	5, 957, 960	60, 807	----------	--------	----------	--------	5, 957, 960	60, 807
Frozen, for food	----------	--------	----------	--------	78, 750	3, 544	78, 750	3, 544
Pickled, for food:								
Scotch cure	1, 382, 895	87, 221	3, 011, 375	166, 195	3, 686, 975	209, 394	8, 081, 245	462, 810
Norwegian cure	90, 250	5, 363	11, 500	920	43, 625	2, 873	145, 375	9, 156
Special cure for repacking	33, 600	2, 520	----------	--------	----------	--------	33, 600	2, 520
Roused, for food (bloater stock)	12, 500	500	----------	--------	340, 000	14, 545	352, 500	15, 045
Spiced	2, 000	300	----------	--------	----------	--------	2, 000	300
Dry-salted	----------	--------	----------	--------	150, 750	6, 395	150, 750	6, 395
Meal	19, 502, 823	557, 576	3, 908, 200	97, 474	----------	--------	23, 411, 023	655, 050
Oil	[1] 22, 079, 363	729, 984	[2] 4, 511, 302	146, 029	----------	--------	[3] 26, 590, 665	876, 013
Total	52, 027, 646	1, 480, 880	11, 715, 677	415, 040	4, 400, 725	237, 757	68, 144, 048	2, 133, 677

[1] 2,943,915 gallons.

[2] 601,507 gallons.

[3] 3,545,422 gallons.

HALIBUT

Partly as a result of economic conditions and partly because of poor fishing in some localities, the production of halibut in Alaska showed a considerable decline as compared with that of 1929. In accordance with a voluntary agreement among the halibut fishermen, both Canadians and Americans, the fishing season was not opened on the usual date, February 16, but was postponed until two weeks later so that new production would be withheld until the overabundant stocks of frozen halibut from the previous season could be reduced. Despite this action, prices were generally lower throughout the year than in 1929, reaching their lowest level in August, when production was at its peak. In September, however, prices became more firm as landings decreased, and almost equaled the 1929 figures toward the close of October.

Further operations to the westward were undertaken, one vessel penetrating as far as the Pribilof Islands in Bering Sea. Halibut were found in fair numbers, but any extensive exploitation of the fishery in this remote region must await the establishment of local freezing plants or increased facilities for transporting the fish to the Pacific ports. The cold-storage ship *Donna Lane* was operated by the Utopian Fisheries (Inc.) at Dutch Harbor, where a larger load of halibut was secured than in any preceding year.

At the request of the Fishing Vessel Owners Association a patrol of the halibut banks was maintained by the Coast Guard Service at the beginning of the fishing season and again toward its close, to guard against disasters. Fortunately no serious trouble developed. Weather conditions were unusually favorable during the greater part of the season and the loss of life and property in Alaskan waters was less than for several years. One man was killed by an explosion in the engine room of the *Alten* on Portlock Bank, and another was lost overboard from the *Grayling*. The schooner *Panama* was driven ashore on Marmot Island in the first part of the season and was totally wrecked, but with no loss of life. The *Omaney* was wrecked on Sitkalidak Island, and the *Liberty* grounded on a reef in the vicinity of Trinity Islands; both were subsequently refloated and taken to Kodiak for repairs.

The work of investigating the life history of the Pacific halibut was continued by the International Fisheries Commission under the supervision of Dr. Will F. Thompson. This included tagging experiments, collection of eggs and larvæ, and compilation of statistics on the fishery along the same lines as in previous seasons. The schooner *Dorothy* was again chartered for carrying on these oceanic studies, which were extended into Bering Sea. The Canadian schooner *Melville* was used also by the commission for field work.

A new convention between the United States and Canada for the preservation of the halibut fishery of the northern Pacific Ocean and Bering Sea was signed at Ottawa on May 9, 1930, to replace that signed at Washington on March 2, 1923. The general principles of the earlier agreement are embodied in the new, which also gives effect to recommendations made by the International Fisheries Commission and grants to that body additional regulatory powers, with the provision that its proposed regulations shall be subject to the approval of the President of the United States and the Governor General of the Dominion of Canada. Under the terms of the new convention the season for halibut fishing is shortened two weeks, the closing date being advanced from November 15 to November 1 of each year. The treaty, which had been ratified promptly by the Canadian parliament, was ratified by the United States Senate on February 24, 1931.

STATISTICAL SUMMARY

There were 1,176 persons engaged in the halibut industry in 1930—a decrease of 77 from the number reported for the preceding year, and the products totaled 31,557,084 pounds, valued at $2,991,400. This output represents the total fares of the Alaska halibut fleet, which comprises all American vessels landing more than one-half of their catch in Alaska or British Columbia ports rather than in the States. Landings of halibut in Alaska totaled 11,408,984 pounds, valued at $863,089, which include 27,000 pounds, valued at $2,000 landed by Canadian vessels. In 1929 the landings of the Alaska fleet were 37,456,998 pounds, valued at $4,422,605, while landings in Alaska totaled 13,841,874 pounds, valued at $1,424,623. Thus the decrease in fares of the Alaska fleet was 5,899,914 pounds, or approximately 16 per cent in quantity and 32 per cent in value, while landings at Alaska ports decreased 2,432,890 pounds, or about 18 per cent in quantity and 39 per cent in value from the preceding year.

Persons engaged, wages paid, and operating units, Alaska halibut industry, 1930

Items	Southeast Alaska	Central Alaska	Total
PERSONS ENGAGED			
Fishermen: Whites	1,063	------------	1,063
Shoresmen:			
Whites	89	15	104
Natives	9	------------	9
Total	98	15	113
Grand total	1,161	15	1,176
Wages paid shoresmen	$64,006	$18,572	$82,578
OPERATING UNITS			
Vessels:			
Power, over 5 tons	150	------------	150
Net tonnage	3,856	------------	3,856
Launches	11	------------	11
Dories	150	------------	150
Skates of lines	5,784	------------	5,784

Products of the Alaska halibut fishery in 1930

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fresh (including local)	21,662,879	$2,243,131	9,300	$655	6,164	$368	21,678,343	$2,244,154
Frozen	7,707,575	608,082	1,573,050	94,383	594,997	44,625	9,875,622	747,090
Cheeks, frozen	----------	----------	3,119	156	--------	--------	3,119	156
Total	29,370,454	2,851,213	1,585,469	95,194	601,161	44,993	31,557,084	2,991,400

COD

Cod-fishing operations from shore stations in Alaska suffered a sharp decline in 1930, the production being less than one-half that of the preceding year. The products of the offshore fishery, which are not included in the following table because the vessels operate from and land their fares in ports of the Pacific Coast States, were on practically the same level as in 1929, although fewer persons and vessels were employed.

Eight vessels were used in the offshore fleet in 1930. Of these, 1 belonged to Capt. J. A. Matheson, 1 to the Pacific Coast Codfish Co., and 2 each to the Robinson Fisheries Co., J. E. Shields, and Union Fish Co., as listed below. The schooner *John A*, owned by the Pacific Coast Codfish Co., was not operated in Alaska this year. No losses of life or property were reported in the offshore fishery. In the shore fishery five power dories and some miscellaneous fishing gear, valued at $965, were lost.

STATISTICAL SUMMARY

Forty-one persons were employed in the cod industry in 1930—26 less than in the previous year. As heretofore, operations were chiefly in the Shumagin Islands region, although a small output was reported from western Alaska. Products aggregated 322,237 pounds valued at $16,789, as compared with 713,838 pounds valued at $39,756 in 1929. Products of the offshore fishery consisted of 5,963,204 pounds of dry-salted cod valued at $302,118, as against 6,100,751 pounds of dry-salted cod and tongues valued at $352,501 in 1929. The offshore fishery employed 269 persons.

Persons engaged, wages paid, and operating units, Alaska cod industry, 1930

Item	Central Alaska	Western Alaska	Total
PERSONS ENGAGED			
Fishermen:			
Whites	36	2	38
Natives	2		2
Japanese	1		1
Total	39	2	41
OPERATING UNITS			
Shore stations	12	1	13
Vessels:			
Power, over 5 tons	1		1
Net tonnage	15		15
Launches	3		3
Power dories	42	3	45
Rowboats	4	2	6
Apparatus:			
Trawl lines	28	6	34
Hooks	9,825	1,100	10,925
Hand lines	65	2	67

Products of Alaska cod industry in 1930

Item	Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted cod	173,502	$8,269	13,000	$765	186,502	$9,034
Stockfish	15,600	2,090			15,600	2,090
Pickled	110,135	5,265	10,000	400	120,135	5,665
Total	299,237	15,624	23,000	1,165	322,237	16,789

Offshore cod fleet in 1930

Name	Rig	Net tonnage	Operator
Fanny Dutard	Schooner	252	J. A. Matheson, Anacortes, Wash.
C. A. Thayer	do	390	Pacific Coast Codfish Co., Seattle, Wash.
Azalea	do	363	Robinson Fisheries Co., Anacortes, Wash.
Wawona	do	413	Do.
Sophie Christenson	do	570	J. E. Shields, Seattle, Wash.
Charles R. Wilson	do	328	Do.
Louise	do	328	Union Fish Co., San Francisco, Calif.
William H. Smith	do	496	Do.

WHALES

The Port Hobron and Akutan stations of the American Pacific Whaling Co. were again operated in 1930. Seven steam whalers were used, and employment was given to 190 whites, 14 natives, and 2 Japanese—a total of 206, or a decrease of 27 from the number reported employed in the industry in the previous year. The total number of whales taken was 355, consisting of 50 finbacks, 191 humpbacks, 78 sulphur bottoms, and 36 sperm whales. This is a decrease of 30 from the number taken in Alaskan waters in 1929.

The products of the whale fishery consisted of 816,700 gallons of whale oil, valued at $371,276; 121,150 gallons of sperm oil, valued at $45,431; 815 tons of fertilizer from meat, valued at $40,750; 355 tons of bone fertilizer, valued at $10,650; 37,000 pounds of pickled meat, valued at $1,850; and 5,600 pounds of whalebone, valued at $308—a total value of products of $470,265 and a decrease of 6 per cent from 1929 when products were valued at $502,081.

CLAMS

There was a further upward trend in the output of clams in Alaska in 1930. Operations were carried on chiefly in the Prince William Sound area and at Kukak Bay, although a small pack of butter clams was produced in southeast Alaska, where the work was undertaken in the fall as an experiment. Reports indicate that in some of the more favorable localities razor clams are becoming rather scarce, but there are large areas with an abundance of clams which can be dug only when tides and winds are favorable. This is particularly true with respect to the Kukak Bay region. Two clam diggers in central Alaska lost their lives by drowning. Reported property losses amounted to $430.

Employment was given to 283 whites, and the output consisted of 32,802 cases, containing 852,684 pounds, and 100 dozen clams in the shell, with a total value of $241,890—an increase of approximately 21 per cent in quantity and 19 per cent in value over the production in 1929, when 28,001 cases totaling 704,448 pounds, valued at $203,656, were packed.

Products of the Alaska clam industry in 1930

Item	Cases	Pounds	Value
Minced:			
½-pound cans (48 to case)	23,583	565,992	$168,837
10-ounce cans (48 to case)	8,583	257,490	68,282
Whole:			
½-pound cans (48 to case)	50	1,200	300
1-pound cans (48 to case)	583	27,984	4,412
Juice:			
1-pound cans (6 to case)	3	18	9
Total	32,802	852,684	241,840
Fresh, in shell: 100 dozen		240	50
Grand total		852,924	241,890

SHRIMP

Operations in the shrimp industry in Alaska were again carried on by two plants in the southeastern district and resulted in a slightly larger production than in 1929. The grounds fished were near Wrangell and the surrounding islands and in the general vicinity of Petersburg, extending from Farragut Bay south to the eastern end of Sumner Strait.

FIGURE 5.—Shrimp trawlers, Frederick Sound, southeast Alaska

The number of persons engaged in the shrimp fishery was 113, of whom 20 were whites, 54 natives, 22 Japanese, 9 Filipinos, 6 Mexicans, and 2 Chinese. Products consisted of 510,956 pounds of shrimp meat, valued at $210,072, and 2,870 pounds of fresh shrimp in the shell, valued at $431, a total of 513,826 pounds, valued at $210,503. Comparable figures for 1929 show a production of 497,750 pounds of shrimp meat, valued at $200,312.

CRABS

The preparation of crab meat in Alaska was again carried on chiefly by the Northern Sea Food Co., which operated at Petersburg and Cordova. One other operator in the latter place was also engaged in the business. Employment was given to 37 persons, of whom 35 were whites and 2 Filipinos. Products consisted of 87,461 pounds of cold-packed meat, valued at $34,073, and 774 dozen crabs in the shell, valued at $1,324. The total value of products in 1930 was $35,397, as compared with $72,865 in 1929—a decrease of 51 per cent.

While the production of crabs was on a small scale in 1930, some exploratory work was done, particularly in the Prince William Sound region, with a view to developing increased operations in the future.

JAPANESE VESSELS IN BERING SEA

Operations of Japanese floating crab canneries, which have grown phenomenally in the last decade, were extended into Bering Sea in the summer of 1930, when the cannery steamer *Taihoku Maru* engaged in catching and canning spider crabs in those waters. This vessel, of 7,834 tons, 500 feet in length, and 52 feet beam, was manned by a crew of about 300. It was accompanied by the steam beam trawler *Myogi Maru* and a number of power launches.

The United States Coast Guard cutter *Chelan* first made contact with the *Taihoku Maru* on June 30, 1930, when the latter was anchored in 37 fathoms on Baird Bank, 21 miles offshore from Nelson Lagoon on the Alaska Peninsula, in Bering Sea waters at 56° 18′ north latitude, 161° 32′ west longitude. There was no evidence that the vessel was engaged in any fishery activity other than in respect to crab operations. Subsequent contacts by the *Chelan* and other American vessels were made from time to time during July and August in the same general region off the Alaska Peninsula. It is reported that the *Taihoku Maru* packed upward of 20,000 cases of crabs in these waters.

The Japanese Government vessel *Hakuyo Maru* also made a trip to Bering Sea in 1930 and on June 26 was anchored in the waters of Dutch Harbor. This vessel is a training ship of the Imperial Fisheries Institute of Tokyo, and is a modern steel vessel of about 2,000 tons, Diesel power, and well equipped with modern appliances. The personnel consisted of 30 in the crew, and there were 10 officers and instructors as well as 32 students aboard. Regular classrooms with tables, benches, and blackboards were located aft and forward on the main deck. There was also machinery for a miniature canning outfit.

In addition to the foregoing, the *Kokusai Maru,* a trawler belonging to the International Fisheries Co. of Tokyo, did some prospecting during the month of August in Bristol Bay, outside a 15-mile limit. The *Kokusai Maru,* which is 118 feet in length, was equipped with four trawls. When the vessel, en route to Tokyo, entered Dutch Harbor on September 1 to take on a supply of fresh water, it had on board a cargo of approximately 3 tons of salt cod, 300 pounds of crabs, and 30 halibut.

JAPANESE METHOD OF CANNING SPIDER CRABS

The canning of crab meat in Japan had its inception in 1892 near Otaru, in Hokkaido, and has developed rapidly into an important branch of the fishing industry. The establishment of floating canneries by the Japanese in 1916 made possible an increased production at a time when the shore canneries began to feel the effect of intensive local fishing which, statistics indicate, would have ended in severe depletion. The fishing areas were greatly extended and the annual output in 1928 had reached about 400,000 cases, as compared with 170,000 cases in the most favorable year of operation by shore canneries.

The fishing methods employed by these two types of canneries are essentially the same, but they differ greatly from the methods used for taking crabs on the North American coasts. At the present time the Japanese floating canneries use nets of cotton twine, preserved by a tanning process, measuring 165 feet along the cork line, 153 feet along the lead line, and 81 feet in depth. The mesh is 18 inches stretched measure. The nets are held up by glass buoys, each 5 inches in diameter, attached to the cork line by manila ropes. The buoy ropes are 30 to 50 per cent longer than the depth of water, thus preventing the net from hanging as a vertical wall in which the crabs would not become entangled. Rocks are used as leads, one sinker being used for each float.

The fishing season varies somewhat with the locality, but in general it extends from March to November, and the most favorable months are from April to August.

Fishing is carried on at a depth of 20 to 30 fathoms from small boats that accompany the floating canneries. Each boat has a crew of eight men who operate 500 crab nets of the size described. The nets are anchored in gangs or lines of 20 nets attached to each other, the last net being marked with a buoy bearing a colored flag. Net after net is spread until more than 10 miles of sea bottom around a floating cannery may be covered.

After two or three days the nets are lifted and the crabs removed. Care is taken to prevent the crabs from being exposed to the sun for any length of time as this is believed to be one of the causes of deterioration and discoloration of the meat.

The crabs are prepared for canning by first removing the back shell and washing the exposed parts thoroughly. They are then placed in large wire baskets in boiling water for10 to 12 minutes after which they are immediately cooled in salt water. Rapid cooling is said to prevent the crab meat from losing its normal color and later turning black in the can.

After cooling, the meat is removed from the legs and body and carefully separated into four grades based upon quality. The best quality crab meat is obtained from the first segment of the legs, and the body meat is considered the poorest in quality. Other grades are obtained from the smaller segments of the legs. The meat is again washed in cold water and all extraneous débris and insufficiently cooked meat removed.

The washed product is allowed to dry on trays, each tray containing only one grade of meat. When thoroughly dry it is delivered to the "cutters," who trim the pieces to fit the cans. From the "cutters" the meat is conveyed in porcelain dishes to the "hand packers."

The cans used by the Japanese crab packers are made from either lacquered "2A charcoal tin" or lacquered "canners' special coke tin." The insides of the cans are relacquered with a lacquer derived from Japanese cinnabar. The most common can size is the ½-pound flat, but the 1-pound can is also used.

In accordance with Japanese crab-packing regulations, the meat is wrapped in parchment or paraffin paper to prevent contact with the metal of the container. First quality meat is packed on the bottom, sides and top of the can so that the reddish color is on the outside. Second and third grade meat makes up the balance of the contents. Each can is filled to satisfy a definite required weight.

After filling, the tops are put on the cans and clinched loosely. They then pass through a steam exhaust box at a temperature of 212° F. (100° C.). This requires from 7 to 10 minutes, and as the cans emerge from the exhaust box the tops are sealed. The vacuum obtained in this manner varies between 7 and 10 inches.

Processing of crab meat is an operation requiring particular care, as it is said that cooking for too long a time or at too high a temperature is responsible, in part, for a change in taste and appearance of the meat. Japanese experience indicates that the temperature should not be higher than 221.5° F. (105.3° C.) for 80 minutes for the ½-pound can or 224.4° F. (106.9° C.) for 80 minutes for the 1-pound can.

Upon removal from the retort the cans are washed in warm water and promptly placed in cold water. Large fans complete the cooling process. Prompt cooling, as already stated, helps to prevent changes in flavor and appearance of the product.

A comparatively large cannery crew is required because modern machinery plays a very small part in the present methods of packing the spider crab. It has been estimated that a floating cannery with a daily capacity of 300 cases of ½-pound cans requires an operating crew of 162 men, many of whom are skilled workers. In addition, eight boats, each with a crew of eight fishermen, are required to supply such a plant with the necessary raw material.

The rigid inspection of all canned crab intended for export has been responsible for the steady improvement in methods of packing, and consequent improved quality of the product, to which its present popularity is due.

TROUT

Trout operations in Alaska in 1930 were incidental to other branches of the fishery industry. The products were as follows: Dolly Vardens, 51,688 pounds fresh, valued at $6,762; 21,607 pounds frozen, valued at $2,161; and 250 pounds pickled, valued at $30; steelheads, 10,375 pounds fresh, valued at $1,280; 5,246 pounds frozen, valued at $263; 200 pounds pickled, valued at $20; 7,296 pounds canned, valued at $974; and 1,584 pounds smoked and packed in olive oil, valued at $594. The total production of both species was 98,246 pounds, valued at $12,084, as against 97,125 pounds, valued at $11,259 in 1929—an increase of approximately 1 per cent in quantity and 7 per cent in value. The greater increase in value was due to the larger output of canned trout this year.

MISCELLANEOUS FISHERY PRODUCTS

Several species of fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed at ports of Alaska and British Columbia and at Seattle. Such products landed in southeastern Alaska in 1930 were as follows: Sablefish, 16,073 pounds fresh, valued at $574; 422,590 pounds frozen, valued at $19,400; and 10,800 pounds pickled, valued at $540; rockfishes, 5,876 pounds frozen, valued at $122; flounders, 245,000 pounds fresh, valued at $6,125, and 73,936 pounds frozen, valued at $1,829; "lingcod", 423 pounds fresh, valued at $13, and 22,403 pounds frozen, valued at $672. In addition, there was an output of 37,720 pounds of fresh smelt valued at $5,281 reported from central Alaska, where three fishermen and eight shoresmen, all whites, were employed in the industry. The fresh flounders shown herein were used in Alaska for mink feed.

FUR-SEAL INDUSTRY

PRIBILOF ISLANDS

GENERAL ADMINISTRATIVE WORK

In the calendar year 1930, 42,500 fur-seal skins were taken on the Pribilof Islands, of which 34,382 were taken on St. Paul Island and 8,118 on St. George Island. The take on both islands shows an increase of 2,432 over the take in 1929. Of the total number of fur seals killed, 41,409 were 3-year-old males. A suitable number of animals of this age class was reserved to provide for future breeding stock. The care of fox herds was given attention on both islands, and during the 1930–31 season 915 fox skins were obtained.

Good progress was made in the construction of new buildings for the natives and for use in connection with general sealing operations. In order to provide better landing facilities on St. Paul Island considerable work was done on a new dock at East Landing. Some extension of improved roads was accomplished on both islands.

The completion of the new power vessel *Penguin* and its entry into service in the spring of 1930 was of material advantage in the administration of the bureau's sealing activities, which are increasing from year to year.

Through the courtesy of the Navy Department the U. S. S. *Sirius* again transported from Seattle the general annual shipment of supplies required at the Pribilof Islands. Valuable assistance was rendered also by vessels of the United States Coast Guard, which maintained a patrol of waters frequented by the fur seals and performed other services in connection with the bureau's work at the islands.

The Canadian and Japanese Governments continued the practice of having their shares of Pribilof Islands fur-seal skins sold by the United States, which results in the payment to them of money instead of the actual delivery of skins. The United States' share of fur-seal skins taken by the Japanese Government in 1930 was received at St. Louis in January, 1931.

TRANSPORTATION OF SUPPLIES

Through the cooperation of the Navy Department, the U. S. S. *Sirius* transported the major portion of the general supplies required for the Pribilof Islands.

The *Sirius* sailed from Seattle on July 24, carrying approximately 1,766 tons of general supplies, 1,065 tons of coal, and 550,000 feet of lumber, and arrived at the Pribilofs August 1. The vessel left the islands on August 23 carrying 30,433 fur-seal skins, miscellaneous freight and three passengers for the bureau to Seattle.

The bureau's new power vessel *Penguin* has been of material advantage in the shipment and transportation of supplies to the islands. The vessel sailed from Seattle on the evening of May 5 on its first voyage to Alaska, carrying 100 tons of cement and 75 tons of general supplies. Her next voyage was made the following month, leaving Seattle June 7 with 102½ tons of salt and 62 tons of general cargo. A shipment of perishable supplies was taken north on the steamship *Catherine D* and delivered to the *Penguin* at King Cove on July 10, for transfer to the islands. The fall supplies, consisting chiefly of perishable foodstuffs, were shipped from Seattle on the *Penguin* on October 6.

POWER VESSEL "PENGUIN"

The power vessel *Penguin*, newest and largest of the bureau's Alaska vessels, which was launched at Seattle, Wash., on January 8, 1930, left Seattle for the Pribilof Islands on its maiden voyage on May 5, with 175 tons of general cargo and 17 bureau employees, and arrived at the islands on May 16. After landing passengers and cargo and performing some interisland work, the vessel proceeded to Unalaska and thence to Akutan, where seven native workmen were taken aboard for passage to the islands. On the return voyage the *Penguin* left the Pribilofs on May 22 and arrived at Seattle nine days later on May 31, the passage being by the outside route.

On June 7 the *Penguin* left Seattle on its second journey north, carrying general cargo, 4 members of the bureau's staff, and 17 Fouke Fur Co. employees to assist with sealing operations. The Pribilofs were reached on June 17 and on the following day the vessel departed on a trip to various points on the Alaska Peninsula to secure native workmen, 11 of whom were landed at the islands on June 27. A shipment of 800 sacks of cement was then transferred from St. George Island to St. Paul Island. During the first half of July a trip was made to King Cove to transfer passengers, mail, and perishable supplies that had been brought north on the steamship *Catherine D*. The remainder of the month was spent in interisland transportation and assisting in the computation of the fur-seal herd. The *Penguin* sailed from the Pribilofs on July 31 with passengers (Fouke Fur Co. men and bureau employees) and 160 barrels of fur-seal skins and reached Seattle on August 12, where it was tied up at Lake Union for the remainder of the month for minor repairs and general cleaning.

From September 6 to September 26 the *Penguin* was on a trip to southeast Alaska assisting with the gathering of data on the salmon escapement in the Ketchikan district. On October 6 the *Penguin* sailed from Seattle for the Pribilofs via Ketchikan and Unalaska, arriving at St. George Island on October 17. An operator for the St. Paul Island radio station and his wife and child were passengers on the vessel, as were also three members of families of bureau employees stationed at the islands. Transportation work between the islands and Unalaska was then undertaken and on October 25 the vessel departed for Seattle, stopping en route at a number of villages along the Alaska Peninsula to return native workmen to their homes. A stop was made also at Cordova in order to land the ship's cook for hospital care. Seattle was reached on November 7.

The *Penguin* sailed from Seattle on December 8, via Ketchikan, Juneau, and Seward, and reached its headquarters at Unalaska on December 29. Cold and stormy weather during the latter part of the voyage necessitated taking shelter in several harbors to ride out the gale and to clear the ship of accumulated ice. On this first encounter with particularly severe weather conditions, the vessel performed remarkably well. During the year the *Penguin* traveled 20,621 nautical miles.

ROADS

St. Paul Island.—In the spring, when weather permitted, the entire Big Lake Road was graded, making an excellent water-level road for tractors. It is possible to drive trucks easily over scoria-surfaced roads as far as Big Lake, but the sandy nature of the area between Big Lake and Northeast Point precludes any possibility of driving trucks beyond Big Lake until the roadway has been surfaced. A sufficient amount of road lumber for this purpose is now on hand and has been distributed at strategic points along the roadway. One-half mile of road was built between Big Lake and Northeast Point during June, and the power shovel was employed along the road during July, August, September, and October. Considerable road lumber was hauled from the village to various points along the roadway during the year. A side road, about three-fourths of a mile in length, to a scoria deposit in Polovina Hill was constructed.

St. George Island.—During the brief period between the time when the ground became sufficiently thawed to permit operations and the beginning of the sealing season, a considerable amount of work was done on the road to North Rookery, grading the road and digging drainage ditches which are very necessary on account of the swampy character of the terrain. In the fall after sealing operations were finished, 700 feet of the North Rookery road was surfaced with plank, which had been shipped to St. George Island the previous fall for this purpose.

BUILDINGS

St. Paul Island.—The new schoolhouse, started last season, was completed and ready for occupancy by the beginning of the school year. The main floor consists of two large, airy, and well-lighted classrooms and the basement is divided, one side being for the use of the boys and the other side for the use of the girls. The boys' side is being equipped for manual-training work; practical carpentry, electric wiring, painting, and other trades will be taught. The girls' side has been equipped to represent a model kitchen in which sewing or cooking classes will be held each afternoon. Connecting with the main rooms on each side of the building are dressing rooms and showers which are used twice a week by all the children.

A building, 32 by 74 feet, to house the electrical plant and cold storage was completed with the exception of laying cement floor in a portion of the engine room. In one end of the building are three cold-storage rooms, of which the center room will be used for freezing and the other two for storage of meat. Another room contains the compressor and engine for the cold-storage plant—a 25-horsepower

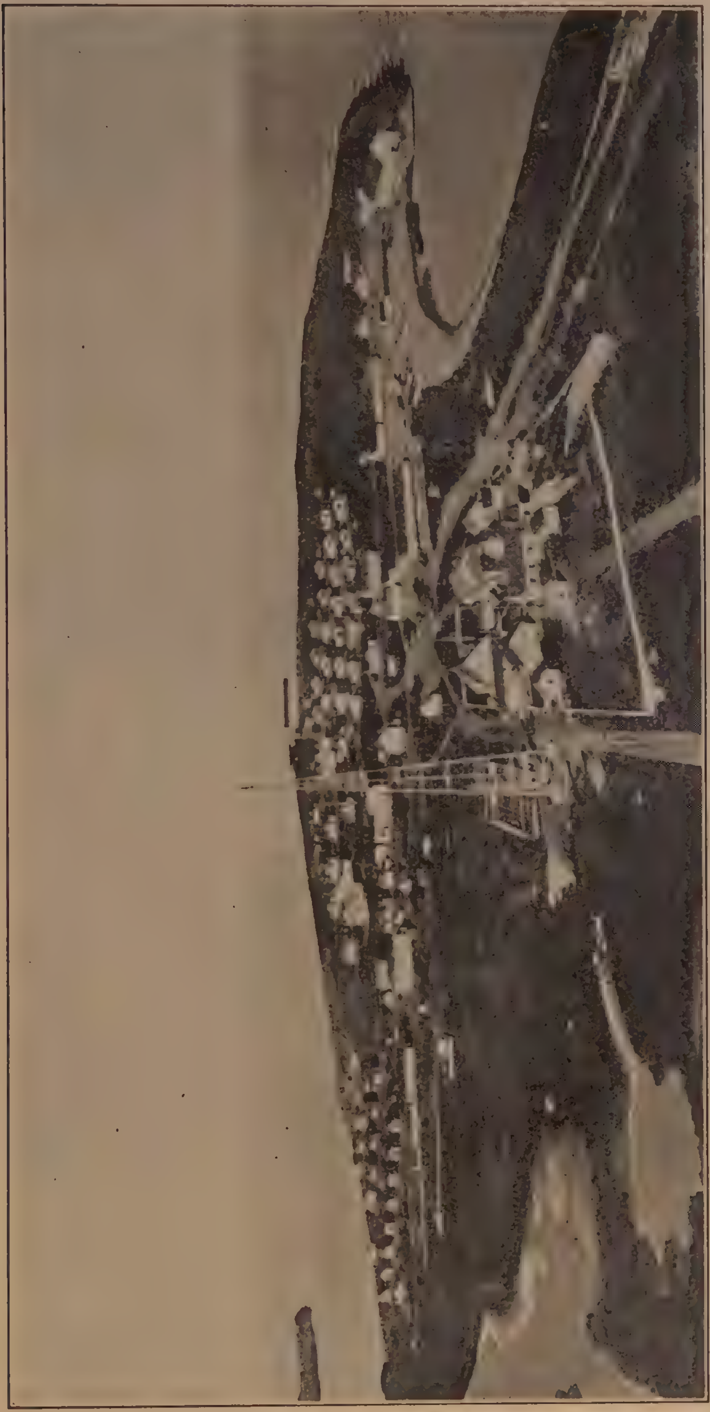

FIGURE 6.—Village on St. Paul Island, Alaska

semi-Diesel with a belt-driven 15-kilowatt, direct-current generator and a set of Edison batteries. The other room will contain the electrical power plant purchased this season, consisting of two Washington-Estep full-Diesel engines of 135 brake-horsepower each, and two 85 kilowatt, 105 kilovolt-ampere, 3-phase, 60-cycle, 480-volt, alternating-current, direct-connected alternators. The two engines and alternators have been placed upon foundations, and it is expected that the remainder of the equipment will be connected during the winter. This power plant will be used to operate motors which will eventually replace all the various stationary, internal-combustion engines operated in the village.

A 43 by 74 foot extension was added to the sealskin washhouse to be used for the blubbering of sealskins; and the foundation was laid for an additional washhouse which will provide space for handling increased takes of sealskins.

The outside and part of the inside work of a new hospital, size 28 by 40 feet, was completed, and it is reported that the inside work will be entirely finished in the winter of 1930–31.

In the past there have been no facilities for the unloading of lighters and small boats which were usable at ebb tide, and the principal landing on the west side of the island has of recent years become so congested with rocks, sand, and silt that, especially after storms, which wash the débris into the channel, operations at any stage of the tide have been problematical. To cope with this difficulty, a new dock on the opposite side of the island at the so-called East Landing was undertaken and partly completed. When finished it will be 50 feet wide and 140 feet long, extending out from the shore a sufficient distance to permit unloading at any stage of the tide. Extreme difficulties were encountered in the construction work, the forms for concrete having been washed out time after time so that it was impossible to complete the dock before arrival of the annual supply ship. At this time it had been built out 80 feet and, when temporarily filled and covered, greatly facilitated the discharging of cargo. Completion during the spring of 1931 is anticipated.

St. George Island.—The six native cottages begun in 1929, two of which contain 5 rooms, two 4 rooms, and two 3 rooms, were completed during the year.

A new salt house, 34 by 100 feet, containing eight 10 by 20 foot kenches for the salting of sealskins, was constructed.

For the accommodation of unmarried employees and transients, a new building, size 30 by 56 feet, was erected. This building, located on a hillside, has an open basement in which are the dining room, kitchen, and cook's quarters. The main floor contains three bedrooms, a bathroom, and a library, and the upper floor also has three bedrooms and a bathroom. The inside work will be completed during the winter.

BY-PRODUCTS PLANT

The old by-products plant was not operated in 1930. A special appropriation became available so that this establishment could be modernized and enlarged. Accordingly, machinery and building materials were purchased and sent to St. Paul Island in the summer of 1930.

The new machinery is of the kind now finding increased favor with the meat-packing industry. The type of reduction accomplished with the equipment is known as "dry rendering." By this process chopped seal carcasses will be cooked and dried in one operation and the fat which is fried from the flesh tissue will be removed from the dried material in high-pressure extraction equipment. The new cooker-dryers, four in number, are well-designed steam-jacketed fat melters of the batch type, so designed as to permit operation either under pressure or under vacuum. Each cooker will be driven by an electric motor. The pressure extraction equipment consists of two high-pressure hydraulic presses. These presses are of rugged design and should give efficient and dependable service, a prerequisite of any machinery to be used in an isolated location.

The estimated capacity of the new equipment is approximately 40,000 pounds of seal carcasses per day of 8 hours. On this basis about 40,000 seal carcasses can be handled by one working shift during a sealing season. In addition, the old plant will be available for use also. This equipment is admirable for rendering blubber and can be used if necessary when peaks in killings occur.

In order to house the new machinery an extension 75 by 45 feet was made to the building housing the old by-products machinery. To this extension a separate room 40 by 37 feet was added for the new boilers which were needed as replacements and were necessary to meet the greater requirements of the new machinery. Foundations were laid for a new building for the storage of oil, and the structure is to be completed in the spring of 1931.

The new cookers, presses, and boilers have been set up and considerable auxiliary equipment has been installed, including the new Diesel-driven generator set for supplying light and power to the island. It is anticipated that unless some unforeseen difficulty arises the new establishment will be ready to operate in the season of 1931.

NATIVES

CENSUS

The annual census, taken as of December 31, 1930, showed 222 native residents on St. Paul Island. In addition, one St. Paul native, formerly enrolled at the Salem Indian School, Chemawa, Oreg., was in the States, and 10 were elsewhere, making a total of 233 accredited to the island. Two natives were recorded as having permanently left the island and five, from St. George Island, as having become permanent residents of St. Paul Island. One native who was reported as temporarily absent at the close of 1929 has been dropped from the census list, as there is little likelihood of his returning to the island. During the year there were 11 births and 4 deaths among the natives, including the death of one who was temporarily absent from the island.

On St. George Island there were 142 native residents as of December 31, 1930. Five natives left the island and became permanent residents of St. Paul Island and one St. Paul Island native became a permanent resident of St. George Island. There were seven births and five deaths during the year.

The total number accredited to both islands on December 31, 1930, was 375, a net increase of seven over the figures for the preceding year.

MEDICAL SERVICES

For the benefit of the native population and Government employees and their families at the Pribilof Islands, medical care is provided by the bureau. One physician was stationed at St. Paul Island and another at St. George Island throughout the year. Health conditions, in general, were good on both islands.

SCHOOLS

Schools for the native children were maintained on both St. Paul and St. George Islands. Two regular teachers were employed on St. Paul Island and one regular and one temporary teacher on St. George Island.

St. Paul Island.—The 1929–30 school year began September 9, 1929, and closed May 29, 1930. There were 32 pupils enrolled in the junior and 30 in the senior school, a total of 62 pupils.

St. George Island.—The school opened on September 23, 1929, and closed May 30, 1930. In the senior school 9 boys and 13 girls were enrolled and in the junior school 8 boys and 9 girls, a total of 39 pupils.

ATTENDANCE AT SALEM INDIAN SCHOOL, CHEMAWA, OREG.

The three children (Mariamna Merculieff, Kleopatra Krukoff, and Abraham S. Merculieff) who were enrolled at the Salem Indian School, Chemawa, Oreg., at the beginning of 1930 returned to the Pribilof Islands in July. They were passengers from Seattle on the U. S. S. *Sirius* when it transported the annual shipment of general supplies to the islands. There have been no new enrollments of Pribilof natives at this school since 1926, as it is now the policy not to accept pupils from Alaska at Chemawa, save in exceptional cases.

SAVINGS ACCOUNTS

The Commissioner of Fisheries as in previous years had in his custody certain funds of a number of the Pribilof Islands natives. He also held funds belonging to the native church on St. Paul Island. These funds were kept on deposit in the Washington Loan and Trust Co., Washington, D. C. Interest at the rate of 3 per cent per annum was calculated on monthly balances and credited semiannually. The accounts of two natives were closed during the year. A summary of the accounts as a whole for the year 1930 is shown in the statement that follows:

On hand, Jan. 1, 1930	$9,573.08
Interest earned from Jan. 1 to Dec. 31, 1930	275.08
	9,848.16
Withdrawn by natives and native church in 1930	1,220,26
On hand, Dec. 31, 1930	8,627.90

An itemized statement of the funds, showing the individual accounts follows:

Funds of the Pribilof Islands natives and the St. Paul Island native church in the custody of the United States Commissioner of Fisheries, as trustee, December 31, 1930

Bourdukofsky, Martha	$81. 04
Fratis, Iuliania [1]	125. 00
Gromoff, Iuliania	342, 79
Kochutin, Alexandra	3, 707. 65
Kozloff, Raisa	108. 05
Lekanof, Sophia M	79. 93
Lestenkof, Michael	364. 26
Merculief, Alexandra	208. 67
Merculief, Daniel	569. 72
Merculief, Erena	650. 93
Merculief, George	230. 99
Merculief, jr., George	$61. 73
Merculief, Nicolai G	76. 15
Merculief, Tatiana	650. 93
Pankoff, Agrippina	176. 53
St. Paul Island native church	949. 47
Sedrick, Lavrenty	128. 90
Shane, Marina	115. 16
Total	8, 627. 90

PAYMENTS FOR TAKING FUR-SEAL SKINS

For work in connection with the taking, curing, and shipping of fur-seal skins the resident natives of the Pribilof Islands receive a flat payment of 75 cents for each sealskin taken. The payments are made in cash and are distributed among the men and boys taking part in the work in accordance with the rated ability and skill of each. The persons entitled to this compensation are divided into classes, the individuals in each class receiving equal amounts. In addition, small bonuses in cash are allowed for special work in connection with the sealing operations. Payments were made as shown below:

St. Paul Island.—For the 34,382 skins taken on St. Paul Island the sum of $25,786.50 was paid and in addition a total of $100 was allowed two foremen for special services and $50 for a cook. A statement of the earnings follows:

Payments to St. Paul Island natives for taking fur-seal skins, calendar year 1930

Classification	Number of men	Share of each	Total
First class	33	$543. 75	$17, 943. 75
Second class	10	429. 75	4, 297. 50
Third class	6	308. 25	1, 849. 50
Fourth class	6	208. 50	1, 251. 00
Fifth class	5	51. 75	258. 75
First boys' class	6	30. 00	180. 00
Second boys' class	1	6. 00	6. 00
Foreman (additional compensation)			60. 00
Do			40. 00
Cook			50. 00
Total			25, 936. 50

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[1] Not living on Pribilof Islands in 1930.

St. George Island.—For the 8,118 sealskins taken on St. George Island the sum of $6,088.50 was paid, and in addition a total of $100 was allowed two foremen for special services. A statement of the earnings follows:

Payments to St. George Island natives for taking fur-seal skins, calendar year 1930

Classification	Number of men	Share of each	Total
First class	20	$203.25	$4,065.00
Second class	6	161.25	967.50
Third class	4	121.50	486.00
Fourth class	5	83.25	416.25
Fifth class	3	44.25	132.75
Boys' class	2	10.50	21.00
Foreman (additional compensation)			55.00
Do			45.00
Total			6,188.50

PAYMENTS FOR TAKING FOX SKINS

The natives are paid $5 in cash for each fox skin taken on the Pribilof Islands. For the season of 1929–30 these payments amounted to $1,120 for the 224 skins taken on St. Paul Island and $2,755 for the 553 skins taken on St. George Island, a total of $3,875. No payment was made for two of the skins taken on St. George Island, due to a miscount of the total take, which was not discovered until the skins were being packed for shipment in May.

FUR SEALS OF PRIBILOF ISLANDS

NATURAL HISTORY

The American fur-seal herd, numbering more than three-fourths of all the fur seals in the world, makes its summer home on the Pribilof Islands near the center of Bering Sea. The herd has its breeding grounds on these islands.

First to arrive in the late spring are the adult males, who take up definite positions on the beach, usually 75 to 100 feet apart, and await the coming of the females, who arrive shortly, heavy with young. Each female apparently affiliates with the adult male nearest the point of her arrival. He guards the females jealously, with his life if need be, until after the birth of the young, which usually occurs within a few days following the arrival of the female. Fur seals are highly polygamous, each male mating with sometimes as many as 60 or more females.

The immature males, or "bachelors," from 2 to 5 or 6 years of age, also come to the islands during the breeding season, and congregate on areas adjacent to but separate from the breeding grounds. The combativeness and superior size of the adult males, who attain full growth at the age of 7 or 8 years, prevent the younger males from entering "rookeries," as the breeding areas are designated.

From the fact that fur seals are apparently born in equal numbers as to sex and yet breed polygamously, it is obvious that the large surplus of males can be taken for fur without detriment to the proper growth of the herd. Killings are confined chiefly to 3-year-old males. Great care is taken to mark by clipping a patch of fur and to set aside a sufficient number of males to form an adequate breeding reserve.

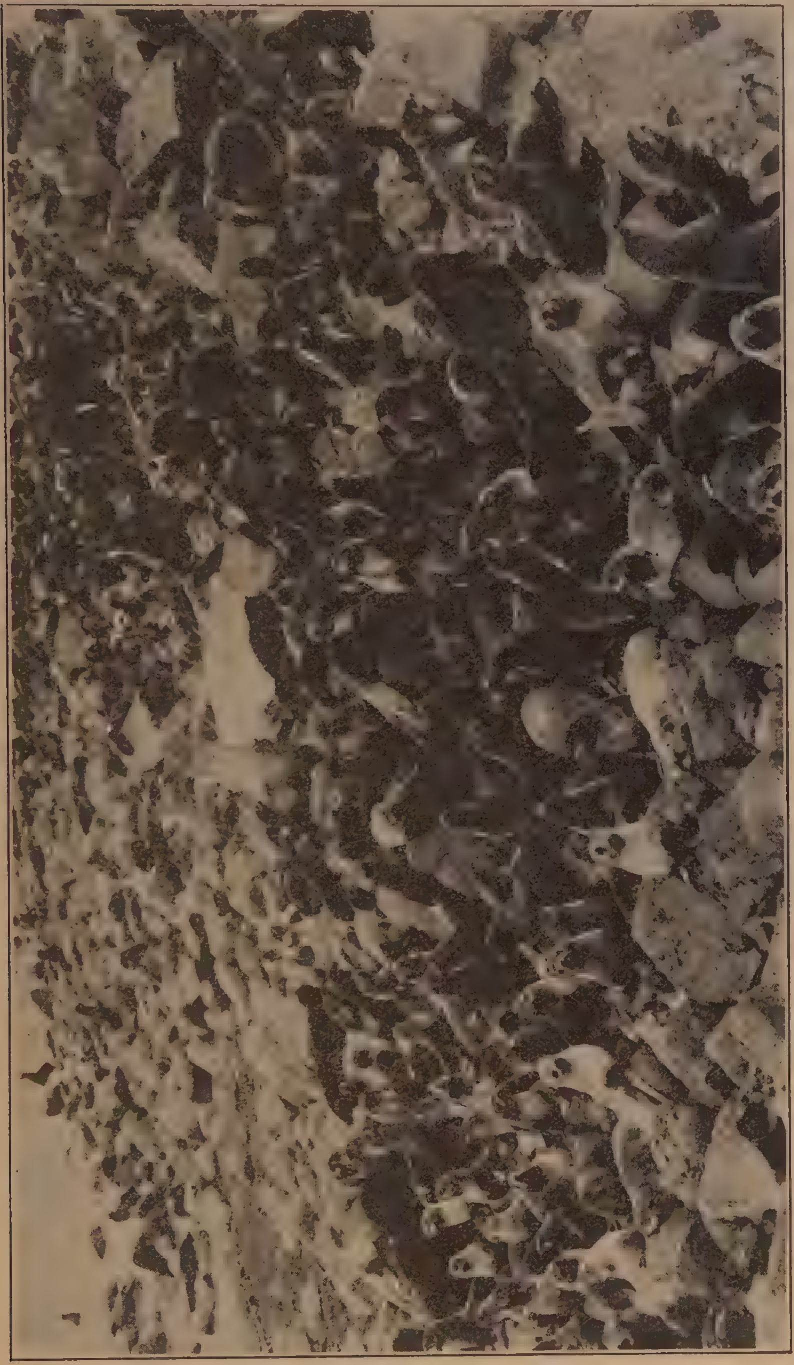

FIGURE 7.—Fur seals at Pribilof Islands, Alaska

The natural segregation of the young males is of material aid in driving the seals to the killing field. A few of the native workmen can run between the area which the seals occupy and the sea, and easily drive them further inland like sheep without disturbing those occupying the breeding grounds.

There is a great difference in the size of the adult males and the adult females, the full-grown male reaching a maximum weight of about 700 pounds, while the females weigh from 75 to 100 pounds. This disparity in size is of great advantage to the male in maintaining discipline over his flock. The females give birth to their first young at the age of 3 years, the period of gestation being between 11 and 12 months.

The nomenclature used in respect to these animals is rather unusual, most of the names being literal translations of the Russian and native names. The adult males are called "bulls"; the adult females, "cows"; the young, "pups"; and the male seals midway in age between pups and bulls are called "bachelors." Each bull's collection of females is called a "harem."

When the breeding season ends at the Pribilofs, the seals gradually take to the water, where they remain until returning to the islands in the following year. While at sea they migrate southward through the passes of the Aleutian Islands, thence southeastward along the coast of North America. The females go as far south as the latitude of Southern California, the younger males do not proceed so far, while the adult males winter in the Gulf of Alaska and south of the Aleutian chain from whence, in the spring, the annual cycle of migration is resumed.

QUOTAS FOR KILLING AND RESERVING

The plans approved by the department for sealing operations in 1930 provided for reserving 8,000 3-year-old male fur seals for future breeding stock and killing as many of the remaining 3-year-old males as were available. The animals for the reserve were to be selected in approximately the ratio of 4 on St. Paul Island to 1 on St. George Island and were to be marked so as to insure their immunity from slaughter throughout the period of sealing operations. Provision was made for increasing the reserve if counts of the idle and harem bulls in the breeding season indicated the advisability of such action. Inasmuch as some of the 3-year-old males are never taken up in either the killing drives or the drives for marking reserves, the number of animals remaining for the reserve is always greater than the number marked.

KILLINGS

In 1930, 42,500 fur seals were killed, of which 34,382 were taken on St. Paul Island and 8,118 on St. George Island. The fall killings have been discontinued. Details in regard to the killings are shown in the following tabulations:

Seal killings on Pribilof Islands in 1930

ST. PAUL ISLAND

Date	Serial No. of drive	Hauling ground	Skins secured
June 4	1	Sea Lion Rock (Sivutch)	23
9	2	Reef and Gorbatch	111
16	3	Tolstoi, Lukanin, and Kitovi	65
18	4	Zapadni and Little Zapadni	167
19	5	Reef and Gorbatch	746
20	6	Polovina and Little Polovina	72
21	7	Vostochni and Morjovi	604
22	8	Tolstoi, Lukanin, and Kitovi	158
23	9	Zapadni and Little Zapadni	290
24	10	Reef and Gorbatch	1, 253
25	11	Polovina and Little Polovina	119
26	12	Vostochni and Morjovi	1, 012
27	13	Tolstoi, Lukanin, and Kitovi	238
28	14	Zapadni and Little Zapadni	712
29	15	Reef and Gorbatch	2, 287
30	16	Polovina and Little Polovina	294
July 1	17	Vostochni and Morjovi	1, 997
2	18	Tolstoi, Lukanin, and Kitovi	266
3	19	Zapadni and Little Zapadni	997
5	20	Reef and Gorbatch	2, 118
6	21	Polovina and Little Polovina	330
7	22	Vostochni and Morjovi	2, 118
8	23	Tolstoi, Lukanin, and Kitovi	720
9	24	Zapadni and Little Zapadni	832
10	25	Reef and Gorbatch	3, 339
11	26	Polovina and Little Polovina	400
12	27	Vostochni and Morjovi	2, 030
13	28	Tolstoi, Lukanin, and Kitovi	414
14	29	Zapadni and Little Zapadni	612
15	30	Reef and Gorbatch	1, 667
16	31	Polovina and Little Polovina	569
17	32	Vostochni and Morjovi	1, 644
18	33	Tolstoi, Lukanin, and Kitovi	451
19	34	Zapadni and Little Zapadni	1, 030
20	35	Reef and Gorbatch	1, 214
21	36	Polovina and Little Polovina	184
22	37	Vostochni and Morjovi	768
23	38	Tolstoi, Lukanin, and Kitovi	195
24	39	Zapadni and Little Zapadni	633
25	40	Reef and Gorbatch	1, 235
26	41	Polovina and Little Polovina	457
29	42	Reef and Gorbatch	10
31	------	Skin from seal that died as a result of reserving operations	1
		Total	34, 382

ST. GEORGE ISLAND

Date	Serial No. of drive	Hauling ground	Skins secured
June 9	1	East	21
11	2	North and Staraya Artil	50
19	3	-----do	134
20	4	East	89
23	5	North and Staraya Artil	130
24	6	East	92
27	7	North and Staraya Artil	422
28	8	East	188
July 1	9	North and Staraya Artil	395
2	10	East	225
4	11	Zapadni	69
5	12	North and Staraya Artil	353
6	13	East	379
8	14	Zapadni	58
9	15	North and Staraya Artil	723
10	16	East	344
13	17	North and Staraya Artil	536
14	18	East	309
17	19	North and Staraya Artil	944
18	20	East	378
21	21	North and Staraya Artil	333
23	22	East	549
24	23	North and Staraya Artil	577
27	24	East and North	818
		Skins from seals that died as a result of reserving operations	2
		Total	8, 118

AGE CLASSES

The age class of a male seal belonging to the Pribilof Islands herd is determined from the length of its body. The classification was derived from the measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

Age classes of male seals, Pribilof Islands

Age	Length of summer seals	Length of fall seals
	Inches	*Inches*
Yearlings	Up to 36.75	Up to 38.75
2-year-olds	37 to 40.75	39 to 42.75
3-year-olds	41 to 45.75	43 to 47.75
4-year-olds	46 to 51.75	48 to 53.75
5-year-olds	52 to 57.75	54 to 59.75
6-year-olds	58 to 63.75	60 to 65.75

Ages of seals killed on Pribilof Islands, calendar year 1930

[On basis of classification shown in preceding table]

Age	St. Paul Island	St. George Island	Total
Yearling males	15		15
2-year-old males	712	53	765
3-year-old males	33,393	8,016	41,409
4-year-old males	227	31	258
5-year-old males	1		1
6-year-old males	1		1
Cows [1]	33	18	51
Total	34,382	8,118	42,500

[1] Cows unavoidably and accidentally killed or found dead.

It should be stated that some of the seals recorded in the above tabulation as 2-year-olds or 4-year-olds probably were 3-year-olds. Not all the male seals of a given age fall within the length limits assigned for the males of that age. As far as possible the killings in 1930 were confined to 3-year-old males.

RESERVING OPERATIONS

The marking of 3-year-old male seals by shearing a patch of fur from their scalps was continued in 1930 in order to provide for the future breeding stock. This mark retains its prominence during and for some time subsequent to the killing season. Since the killing of fur seals at the Pribilof Islands is confined as far as possible to 3-year-old males, this method of marking insures protection during their third year, which is the only time in their whole life when the seals are subject to killing.

During the year, 4,918 3-year-old males were marked on St. Paul Island and 1,621 on St. George Island, a total of 6,539. Reserving operations were interrupted by the arrival of the supply ship and when examination of the grounds was again made the harems had already commenced to break up and there were so many cows and pups mingled with the bachelor seals that it was thought advisable to discontinue marking. Large numbers of unmarked 3-year-old males were observed on all the hauling grounds at that time, assuring an ample reserve for future breeding requirements.

Marking of 3-year-old male fur seals for breeding reserve, Pribilof Islands, 1930

ST. PAUL ISLAND

Date	Hauling ground driven	Number of seals marked
July 27	Vostochni and Morjovi	1,035
28	Tolstoi, Lukanin, Kitovi, and Zapadni	900
29	Reef and Gorbatch	1,726
30	Polovina and Little Polovina	179
31	Vostochni and Morjovi	648
Aug. 1	Reef and Gorbatch	430
	Total	4,918

ST. GEORGE ISLAND

Date	Hauling ground driven	Number of seals marked
June 21	Zapadni	24
July 8	do	10
12	do	50
20	do	122
26	do	107
28	Staraya Artil	200
29	East	318
31	East and Staraya Artil	500
Aug. 3	Zapadni	290
	Total	1,621

COMPUTATION OF FUR-SEAL HERD

The computation of the size of the fur-seal herd in 1930 was again made by Supt. H. J. Christoffers, who was assisted by A. Christoffersen, A. J. Messner, and C. M. Hoverson. As of August 10 the total of all classes was 1,045,101—a numerical increase of 73,574 and a percentage increase of 7.57 over the figures for the preceding year. The detailed report will be found on pages 100 to 108 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1919 to 1930, inclusive.

General comparison of computations of the seal herd on the Pribilof Islands, 1919 to 1930

Classes	1919	1920	1921	1922	1923	1924
Harem bulls	5,158	4,066	3,909	3,562	3,412	3,516
Breeding cows	157,172	167,527	176,655	185,914	197,659	208,396
Surplus bulls	9,619	6,115	3,301	2,346	1,891	2,043
Idle bulls	2,239	1,161	747	508	312	390
6-year-old males	8,991	4,153	3,991	3,771	4,863	8,489
5-year-old males	5,282	5,007	4,729	6,080	10,612	5,132
4-year-old males	5,747	5,667	6,780	11,807	5,710	18,670
3-year-old males	13,596	10,749	14,668	7,459	22,786	21,551
2-year-old males	33,081	39,111	41,893	40,920	43,112	45,685
Yearling males	46,444	51,074	50,249	52,988	55,769	59,291
2-year-old cows	33,287	39,480	43,419	46,280	48,801	51,359
Yearling cows	46,447	51,081	54,447	57,413	60,422	64,240
Pups	157,172	167,527	176,655	185,914	197,659	208,396
Total	524,235	552,718	581,443	604,962	653,008	697,158

General comparison of computations of the seal herd on the Pribilof Islands, 1919 to 1930—Continued

Classes	1925	1926	1927	1928	1929	1930
Harem bulls	3, 526	4, 034	4, 643	6, 050	7, 187	8, 312
Breeding cows	226, 090	244, 114	263, 566	284, 725	307, 491	332, 084
Surplus bulls	3, 558	2, 002	4, 827	5, 285	5, 207	3, 963
Idle bulls	311	423	972	1, 449	1, 633	1, 899
6-year-old males	4, 105	13, 434	13, 450	12, 857	10, 399	5, 612
5-year-old males	16, 792	16, 812	16, 073	13, 001	7, 016	8, 191
4-year-old males	18, 692	17, 872	14, 448	7, 798	9, 102	11, 327
3-year-old males	21, 185	17, 189	9, 730	11, 133	13, 639	14, 871
2-year-old males	43, 515	38, 183	41, 252	49, 087	64, 354	69, 674
Yearling males	52, 091	56, 514	61, 026	65, 861	85, 381	92, 232
2-year-old cows	49, 786	44, 415	48, 186	57, 061	67, 210	72, 605
Yearling cows	57, 309	62, 175	67, 131	72, 481	85, 417	92, 247
Pups	226, 090	244, 114	263, 566	284, 725	307, 491	332, 084
Total	723, 050	761, 281	808, 870	871, 513	971, 527	1, 045, 101

FOXES

On both St. Paul Island and St. George Island attention is given to the care of a herd of blue foxes. Throughout the summer the animals find an abundance of natural food, consisting of fur-seal carcasses, birds' eggs, and marine life along the beaches. In the winter season they are fed preserved seal meat and prepared rations. Captures are made at that time for obtaining pelts or for marking and releasing the animals for breeding stock. The natives perform this work under the direction of the bureau's resident staff and receive $5 for each fox skin taken. The skins are shipped to the Fouke Fur Co. at St. Louis, Mo., where they are sold at public auction for Government account.

TRAPPING SEASON OF 1930–31

During the season of 1930–31 there were taken 915 fox pelts, of which 889 were blue and 26 white. Two hundred and eleven blue and 24 white pelts were taken on St. Paul Island, and 678 blue and 2 white pelts on St. George Island. There were also trapped, marked, and released for breeding purposes 50 foxes on St. Paul Island and 313 on St. George Island. The breeding reserve includes, in addition, a considerable number of animals that were not captured during the season.

REINDEER

St. Paul Island.—During the year ended September 30, 1930, 17 reindeer were killed and used for food. A count of the animals in the herd on September 29 showed a total of 404, of which 70 were the young of the season. The herd was reported to be in good condition.

St. George Island.—No reindeer were killed for food during the year ended September 30, 1930. A count made on October 3 showed 51 animals in the herd, of which 13 were young of the season.

FUR-SEAL SKINS

SHIPMENTS

Two shipments of fur-seal skins were made from the Pribilof Islands in the calendar year 1930. They consisted of 43,300 skins, as follows: From St. Paul Island, 500 taken in 1929 and 34,382 taken in 1930; from St. George Island, 300 taken in 1929 and 8,118 taken in 1930. The first shipment, 12,867 skins from St. Paul Island, went forward on the *Penguin* on July 31. The remaining skins, consisting of 22,015 taken on St. Paul Island and 8,418 taken on St. George Island, were shipped on the U. S. S. *Sirius*, which left the islands on August 23. The *Penguin* reached Seattle on August 12 and the *Sirius* on August 30, and the skins were forwarded immediately by rail to the department's selling agents at St. Louis, Mo.

SALES

In 1930 a total of 34,127 fur-seal skins taken on the Pribilof Islands were sold at two public auction sales held at St. Louis. There were also sold through special sales 348 fur-seal skins taken on those islands. With the following detailed statements of these sales, the sales of other fur-seal skins by the Department of Commerce for the account of the Government are included in order that the records may be complete.

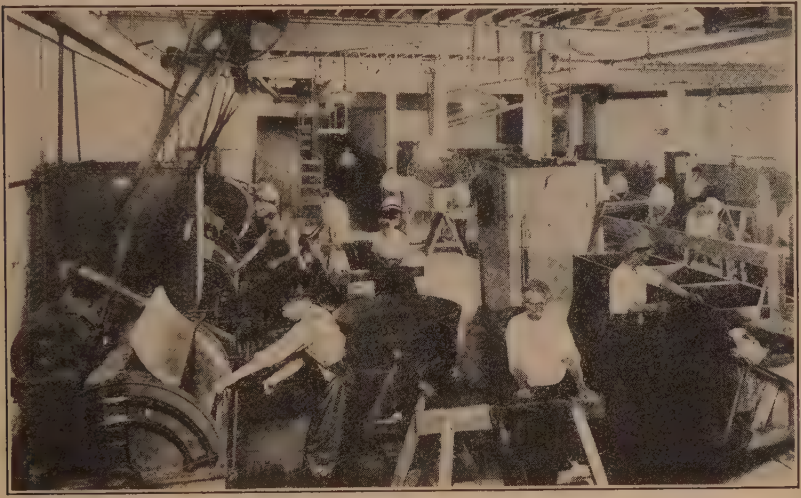

FIGURE 8.—Processing Alaska fur-seal skins at St. Louis, Mo.

Public auction sale, April 7, 1930.—At this sale 14,046 fur-seal skins taken at the Pribilof Islands, dressed, dyed, and machined, sold for $319,290. Of these skins, 8,011 were dyed black and 6,035 logwood brown (Bois de Campêche). Four confiscated fur-seal skins were sold also for $16.50, making a grand total of $319,306.50 for fur-seal skins at this sale.

Public auction sale, September 15, 1930.—At this sale 19,982 fur-seal skins taken at the Pribilof Islands, dressed, dyed, and machined, sold for $357,924.50; and 99 other fur-seal skins, consisting of 3 unhaired and dressed, 13 unhaired, 49 partly unhaired, and 34 raw salted skins, also taken at the Pribilofs, sold for $65.75. In addition, 1 confiscated skin, dressed in hair, brought $1.75, making a total of $357,992 for fur-seal skins at this sale. Of the dressed, dyed, and machined skins, 11,675 were dyed black and 8,307 logwood brown (Bois de Campêche).

Special sales.—In the calendar year 1930, 348 fur-seal skins taken at the Pribilof Islands were sold at special sales for $12,011.48. These skins were dressed, dyed, and machined, 185 being dyed black and 163 logwood brown.

The following tables give further details in regard to all sales of fur-seal skins by the Department of Commerce for the account of the Government in 1930.

Sale of fur-seal skins at St. Louis, Mo., April 7, 1930

8,011 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED BLACK

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
1	70	Large	$36.00	$2,520.00
2	70	do	39.00	2,730.00
3	70	do	39.50	2,765.00
4	70	do	40.50	2,835.00
5	70	do	41.50	2,905.00
6	70	do	43.00	3,010.00
7	70	do	45.50	3,185.00
8	35	do	43.50	1,522.50
9	35	do	45.50	1,592.50
10	42	26 extra large; 16 large	50.00	2,100.00
11	33	3 extra large; 30 large	49.50	1,633.50
12	30	Large	53.00	1,590.00
13	70	Large; scarred, faulty, etc	22.50	1,575.00
14	70	do	22.00	1,540.00
15	70	do	20.50	1,435.00
16	70	do	21.00	1,470.00
17	40	do	24.00	960.00
18	40	do	22.50	900.00
19	40	do	22.50	900.00
20	47	21 extra large, 26 large; scarred, faulty, etc	25.00	1,175.00
21	70	Large; scarred, faulty, etc	20.00	1,400.00
22	70	do	20.50	1,435.00
23	70	do	20.50	1,435.00
24	50	do	20.50	1,025.00
25	40	do	21.50	860.00
26	40	do	23.50	940.00
27	80	Medium	29.50	2,360.00
28	80	do	30.00	2,400.00
29	80	do	31.50	2,520.00
30	80	do	30.00	2,400.00
31	80	do	33.50	2,680.00
32	80	do	30.50	2,440.00
33	80	do	31.50	2,520.00
34	80	do	32.00	2,560.00
35	80	do	31.50	2,520.00
36	80	do	30.00	2,400.00
37	80	do	31.00	2,480.00
38	80	do	28.50	2,280.00
39	80	do	32.00	2,560.00
40	80	do	32.00	2,560.00
41	80	do	30.50	2,440.00
42	80	do	31.00	2,480.00
43	80	do	30.00	2,400.00
44	80	do	29.50	2,360.00
45	80	do	28.50	2,280.00
46	80	do	30.50	2,440.00
47	80	do	29.00	2,320.00
48	80	do	27.00	2,160.00
49	80	do	28.00	2,240.00
50	80	do	26.50	2,120.00
51	80	do	27.50	2,200.00
52	55	do	28.00	1,540.00
53	40	do	34.50	1,380.00
54	40	do	27.50	1,100.00
55	40	do	29.50	1,180.00
56	40	do	30.00	1,200.00
57	80	do	32.00	2,560.00
58	43	do	29.50	1,268.50
59	80	Medium; scarred, faulty, etc	16.00	1,280.00
60	80	do	17.00	1,360.00
61	80	do	16.00	1,280.00
62	80	do	15.75	1,260.00
63	80	do	16.50	1,320.00
64	80	do	15.50	1,240.00
65	80	do	15.50	1,240.00
66	80	do	15.00	1,200.00

Sale of fur-seal skins at St. Louis, Mo., April, 7 1930—Continued

8,011 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED BLACK—Continued

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
67	80	Medium; scarred, faulty, etc	$16.00	$1,280.00
68	80	do	16.00	1,280.00
69	80	do	16.00	1,280.00
70	80	do	15.75	1,260.00
71	80	do	15.00	1,200.00
72	80	do	16.50	1,320.00
73	80	do	16.00	1,280.00
74	80	do	15.50	1,240.00
75	80	do	16.00	1,280.00
76	80	do	15.50	1,240.00
77	80	do	16.50	1,320.00
78	80	do	15.50	1,240.00
79	80	do	15.75	1,260.00
80	80	do	16.00	1,280.00
81	80	do	15.50	1,240.00
82	50	do	16.75	837.50
83	50	do	15.50	775.00
84	40	do	16.00	640.00
85	40	do	16.00	640.00
86	80	do	14.50	1,160.00
87	80	do	14.00	1,120.00
88	80	do	13.50	1,080.00
89	80	do	12.75	1,020.00
90	80	do	12.75	1,020.00
91	80	do	13.25	1,060.00
92	80	do	13.00	1,040.00
93	80	do	12.75	1,020.00
94	80	do	12.75	1,020.00
95	80	do	12.75	1,020.00
96	80	do	13.25	1,060.00
97	80	do	13.25	1,060.00
98	40	do	13.50	540.00
99	40	do	13.50	540.00
100	90	Small medium	17.75	1,597.50
101	90	do	17.75	1,597.50
102	90	do	16.50	1,485.00
103	90	do	16.50	1,485.00
104	60	do	16.75	1,005.00
105	50	do	17.25	862.50
106	41	do	18.00	738.00
107	90	Small medium; scarred, faulty, etc	11.50	1,035.00
108	90	do	11.25	1.012.50
109	90	do	11.50	1,035.00
110	60	do	11.50	690.00
111	60	do	11.75	705.00
112	90	do	11.00	990.00
113	90	do	10.50	945.00
114	40	do	11.25	450.00
115	40	III; 1 large, 28 medium, 11 small medium	4.00	160.00
	8,011			177,412.50

6,035 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED LOGWOOD BROWN

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
121	60	Extra large	$40.00	$2,400.00
122	40	do	40.50	1,620.00
123	30	do	35.00	1,050.00
124	60	Extra large; scarred, faulty, etc	22.00	1,320.00
125	40	do	20.00	800.00
126	70	Large	29.25	2,047.50
127	70	do	30.00	2,100.00
128	70	do	35.50	2,485.00
129	70	do	35.50	2,485.00
130	70	do	36.50	2,555.00
131	70	do	36.50	2,555.00
132	70	do	33.50	2,345.00
133	70	do	33.50	2,345.00
134	70	do	34.00	2,380.00
135	70	do	32.00	2,240.00
136	40	do	37.50	1,500.00
137	40	do	49.00	1,960.00
138	45	25 extra large, 20 large	42.00	1,890.00
139	70	Large	32.50	2,275.00
140	70	do	35.00	2,450.00
141	70	do	35.00	2,450.00
142	70	do	35.75	2,502.50

Sale of fur-seal skins at St. Louis, Mo., April 7, 1930—Continued

6,035 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED LOGWOOD BROWN—Continued

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
143	70	Large	$33.00	$2,310.00
144	60	do	35.00	2,100.00
145	35	do	34.50	1,207.50
146	35	do	34.50	1,207.50
147	70	Large; scarred, faulty, etc	23.50	1,645.00
148	70	do	22.00	1,540.00
149	70	do	22.50	1,575.00
150	70	do	21.50	1,505.00
151	40	do	24.50	980.00
152	35	do	20.00	700.00
153	35	19 extra large, 16 large; scarred, faulty, etc	28.00	980.00
154	70	Large; scarred, faulty, etc	18.00	1,260.00
155	70	do	17.00	1,190.00
156	70	do	16.50	1,155.00
157	70	do	17.00	1,190.00
158	70	do	18.50	1,295.00
159	70	do	17.00	1,190.00
160	70	do	17.00	1,190.00
161	35	do	16.50	577.50
162	35	do	17.25	603.75
163	80	Medium	26.00	2,080.00
164	80	do	27.00	2,160.00
165	80	do	26.00	2,080.00
166	80	do	25.50	2,040.00
167	80	do	26.00	2,080.00
168	80	do	27.00	2,160.00
169	80	do	27.50	2,200.00
170	80	do	26.00	2,080.00
171	80	do	27.00	2,160.00
172	80	do	24.00	1,920.00
173	80	do	27.50	2,200.00
174	50	do	27.50	1,375.00
175	50	do	26.00	1,300.00
176	40	do	27.00	1,080.00
177	40	do	27.50	1,100.00
178	40	do	27.50	1,100.00
179	35	do	26.25	918.75
180	80	do	27.50	2,200.00
181	80	do	26.00	2,080.00
182	80	do	27.00	2,160.00
183	80	do	26.00	2,080.00
184	80	do	26.50	2,120.00
185	80	do	25.50	2,040.00
186	40	do	26.00	1,040.00
187	40	do	25.50	1,020.00
188	40	do	29.50	1,180.00
189	80	Medium; scarred, faulty, etc	16.00	1,280.00
190	80	do	16.25	1,300.00
191	80	do	15.50	1,240.00
192	80	do	15.75	1,260.00
193	80	do	17.75	1,420.00
194	60	do	16.25	975.00
195	50	do	15.75	787.50
196	40	do	16.00	640.00
197	80	do	14.00	1,120.00
198	80	do	12.75	1,020.00
199	80	do	12.50	1,000.00
200	80	do	12.50	1,000.00
201	80	do	13.50	1,080.00
202	80	do	12.75	1,020.00
203	80	do	13.00	1,040.00
204	80	do	13.50	1,080.00
205	80	do	13.50	1,080.00
206	40	do	14.25	570.00
207	40	do	14.25	570.00
208	40	do	14.50	580.00
209	40	do	13.00	520.00
210	60	Small medium	16.50	990.00
211	50	do	18.00	900.00
212	90	Small medium; scarred, faulty, etc	10.25	922.50
213	45	do	10.50	472.50
214	40	do	12.50	500.00
215	50	III; 9 extra large, 41 large	4.25	212.50
216	50	III; 42 medium, 8 small medium	3.75	187.50
	6,035			141,877.50

Sale of fur-seal skins at St. Louis, Mo., April 7, 1930—Continued

4 CONFISCATED SKINS

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
217	1	Large; scarred faulty, etc., dressed, dyed, and machined, logwood brown	$9.25	$9.25
218	1	III; medium, dressed, dyed, and machined, logwood brown	1.00	1.00
219	1	Dressed in hair	5.25	5.25
220	1	Raw	1.00	1.00
	4			$16.50

Sale of fur-seal skins at St. Louis, Mo., September 15, 1930

11,675 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED BLACK

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
1	28	3 extra extra large, 25 extra large	$50.00	$1,400.00
2	50	3 extra extra large, 5 extra large, 42 large; scarred, faulty, etc	24.00	1,200.00
3	70	Large	41.00	2,870.00
4	70	do	40.00	2,800.00
5	70	do	46.00	3,220.00
6	70	do	44.00	3,080.00
7	70	do	48.00	3,360.00
8	70	do	48.00	3,360.00
9	70	do	46.00	3,220.00
10	70	do	47.50	3,325.00
11	70	do	45.50	3,185.00
12	70	do	44.00	3,080.00
13	70	do	45.00	3,150.00
14	40	do	44.00	1,760.00
15	35	do	41.50	1,452.50
16	35	do	43.00	1,505.00
17	70	Large; scarred, faulty, etc	21.00	1,470.00
18	70	do	23.00	1,610.00
19	70	do	23.50	1,645.00
20	70	do	22.00	1,540.00
21	70	do	21.50	1,505.00
22	70	do	21.50	1,505.00
23	70	do	21.50	1,505.00
24	70	do	22.50	1,575.00
25	70	do	22.00	1,540.00
26	70	do	21.50	1,505.00
27	70	do	20.50	1,435.00
28	70	do	21.50	1,505.00
29	70	do	21.50	1,505.00
30	70	do	20.50	1,435.00
31	70	do	20.00	1,400.00
32	70	do	18.50	1,295.00
33	40	do	22.00	880.00
34	80	Medium	25.50	2,040.00
35	80	do	25.50	2,040.00
36	80	do	23.50	1,880.00
37	80	do	24.00	1,920.00
38	80	do	23.50	1,880.00
39	80	do	22.50	1,800.00
40	80	do	20.00	1,600.00
41	80	do	18.00	1,440.00
42	80	do	21.50	1,720.00
43	80	do	22.00	1,760.00
44	80	do	20.50	1,640.00
45	80	do	21.50	1,720.00
46	80	do	22.00	1,760.00
47	80	do	21.50	1,720.00
48	80	do	21.00	1,680.00
49	80	do	21.50	1,720.00
50	80	do	22.00	1,760.00
51	80	do	21.00	1,680.00
52	80	do	21.00	1,680.00
53	80	do	21.50	1,720.00
54	80	do	23.00	1,840.00
55	80	do	22.50	1,800.00
56	80	do	21.00	1,680.00
57	80	do	21.50	1,720.00
58	80	do	21.50	1,720.00
59	80	do	22.00	1,760.00
60	80	do	22.00	1,760.00
61	80	do	21.50	1,720.00
62	80	do	22.00	1,760.0
63	80	do	20.00	1,600.0
64	80	do	20.00	1,600.0

Sale of fur-seal skins at St. Louis, Mo., September 15, 1930—Continued

11,675 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED BLACK—Continued

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
65	80	Medium	$20.00	$1,600.00
66	80	do	21.50	1,720.00
67	80	do	21.00	1,680.00
68	80	do	21.00	1,680.00
69	80	do	22.00	1,760.00
70	80	do	23.00	1,840.00
71	80	do	23.00	1,840.00
72	80	do	23.50	1,880.00
73	80	do	22.50	1,800.00
74	80	do	23.50	1,880.00
75	80	do	22.50	1,800.00
76	40	do	23.50	940.00
77	40	do	23.00	920.00
78	40	do	23.00	920.00
79	80	Medium; scarred, faulty, etc	15.00	1,200.00
80	80	do	13.50	1,080.00
81	80	do	14.50	1,160.00
82	80	do	13.00	1,040.00
83	80	do	12.50	1,000.00
84	80	do	13.50	1,080.00
85	80	do	14.00	1,120.00
86	80	do	12.50	1,000.00
87	80	do	14.00	1,120.00
88	80	do	13.00	1,040.00
89	80	do	12.50	1,000.00
90	80	do	12.50	1,000.00
91	80	do	13.00	1,040.00
92	80	do	13.50	1,080.00
93	80	do	13.50	1,080.00
94	80	do	13.50	1,080.00
95	80	do	13.50	1,080.00
96	80	do	13.00	1,040.00
97	80	do	13.00	1,040.00
98	80	do	14.00	1,120.00
99	80	do	13.50	1,080.00
100	80	do	13.00	1,040.00
101	80	do	13.00	1,040.00
102	80	do	13.50	1,080.00
103	80	do	13.00	1,040.00
104	80	do	12.50	1,000.00
105	80	do	13.00	1,040.00
106	80	do	14.00	1,120.00
107	80	do	13.00	1,040.00
108	80	do	13.00	1,040.00
109	80	do	13.00	1,040.00
110	80	do	13.00	1,040.00
111	80	do	13.00	1,040.00
112	80	do	13.75	1,100.00
113	80	do	12.50	1,000.00
114	80	do	13.50	1,080.00
115	80	do	13.00	1,040.00
116	80	do	13.00	1,040.00
117	80	do	13.00	1,040.00
118	80	do	12.50	1,000.00
119	80	do	13.00	1,040.00
120	80	do	13.50	1,080.00
121	80	do	12.00	960.00
122	80	do	12.50	1,000.00
123	80	do	13.00	1,040.00
124	80	do	13.50	1,080.00
125	80	do	13.00	1,040.00
126	80	do	13.00	1,040.00
127	80	do	12.50	1,000.00
128	80	do	12.00	960.00
129	80	do	13.00	1,040.00
130	80	do	12.00	960.00
131	80	do	11.50	920.00
132	80	do	11.00	880.00
133	80	do	11.00	880.00
134	80	do	10.50	840.00
135	80	do	10.50	840.00
136	80	11 large, 53 medium, 16 small medium; scarred, faulty, etc	10.00	800.00
137	40	Medium; scarred, faulty, etc	13.00	520.00
138	40	do	13.50	540.00
139	40	do	12.50	500.00
140	90	Small medium	14.50	1,305.00
141	90	do	13.50	1,215.00
142	90	do	14.00	1,260.00
143	90	do	14.25	1,282.50

Sale of fur-seal skins at St. Louis, Mo., September 15, 1930—Continued

11,675 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED BLACK—Continued

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
144	90	Small medium	$15.00	$1,350.00
145	60	do	14.50	870.00
146	90	Small medium; scarred, faulty, etc	9.00	810.00
147	90	do	9.50	855.00
148	90	do	9.50	855.00
149	90	do	9.75	877.50
150	90	do	9.50	855.00
151	90	do	9.75	877.50
152	90	do	10.25	922.50
153	90	do	10.00	900.00
154	40	do	9.50	380.00
155	47	III; 7 large, 31 medium, 9 small medium	4.00	188.00
	11,675			219,305.50

8,307 DRESSED, DYED, AND MACHINED PRIBILOF ISLANDS SKINS, DYED LOGWOOD BROWN

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
161	29	8 extra extra large, 21 extra large	$42.00	$1,218.00
162	60	4 extra extra large, 15 extra large, 41 large	36.50	2,190.00
163	49	3 extra extra large, 8 extra large, 38 large	35.50	1,739.50
164	37	1 wig, 10 extra extra large, 26 extra large; scarred, faulty, etc	15.00	555.00
165	60	Extra large; scarred, faulty, etc	18.00	1,080.00
166	40	do	17.50	700.00
167	40	do	15.50	620.00
168	70	Large	30.00	2,100.00
169	70	do	28.00	1,960.00
170	70	do	31.00	2,170.00
171	70	do	30.50	2,135.00
172	70	do	30.50	2,135.00
173	70	do	26.50	1,855.00
174	70	do	27.50	1,925.00
175	70	do	28.00	1,960.00
176	70	do	28.50	1,995.00
177	70	do	28.50	1,995.00
178	70	do	27.50	1,925.00
179	70	do	27.50	1,925.00
180	49	do	27.00	1,323.00
181	40	do	29.00	1,160.00
182	40	do	29.50	1,180.00
183	70	Large; scarred, faulty, etc	20.00	1,400.00
184	70	do	19.50	1,365.00
185	70	do	19.00	1,330.00
186	70	do	19.00	1,330.00
187	70	do	15.00	1,050.00
188	70	do	12.50	875.00
189	70	do	12.50	875.00
190	70	do	13.00	910.00
191	70	do	12.75	892.50
192	70	do	12.00	840.00
193	70	do	13.50	945.00
194	70	do	13.00	910.00
195	70	do	13.25	927.50
196	70	do	13.50	945.00
197	70	do	13.75	962.50
198	45	do	13.00	585.00
199	45	do	13.75	618.75
200	43	do	15.00	645.00
201	40	do	15.75	630.00
202	80	Medium	22.00	1,760.00
203	80	do	22.50	1,800.00
204	80	do	21.75	1,740.00
205	80	do	22.50	1,800.00
206	80	do	22.00	1,760.00
207	80	do	21.50	1,720.00
208	80	do	22.00	1,760.00
209	80	do	21.50	1,720.00
210	80	do	22.00	1,760.00
211	80	do	22.00	1,760.00
212	80	do	22.00	1,760.00
213	80	do	22.50	1,800.00
214	80	do	22.00	1,760.00
215	80	do	22.00	1,760.00
216	80	do	22.00	1,760.00
217	80	do	18.00	1,440.00
218	80	do	18.50	1,480.00

Sale of fur-seal skins at St. Louis, Mo., September 15, 1930—Continued

8,307 DRESSED, DYED, AND MACHINED PRIBILOF ISLAND SKINS, DYED LOGWOOD BROWN—Continued

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
219	80	Medium	$18.50	$1,480.00
220	80	do	20.25	1,620.00
221	80	do	20.50	1,640.00
222	80	do	21.75	1,740.00
223	80	do	19.50	1,560.00
224	80	do	21.25	1,700.00
225	80	do	20.25	1,620.00
226	80	do	21.00	1,680.00
227	80	do	20.75	1,660.00
228	60	do	22.50	1,350.00
229	50	do	21.50	1,075.00
230	48	do	21.00	1,008.00
231	80	Medium; scarred, faulty, etc	14.00	1,120.00
232	80	do	14.25	1,140.00
233	80	do	15.00	1,200.00
234	80	do	14.25	1,140.00
235	80	do	14.00	1,120.00
236	80	do	14.50	1,160.00
237	80	do	13.75	1,100.00
238	80	do	12.00	960.00
239	80	do	12.00	960.00
240	80	do	13.75	1,100.00
241	80	do	12.25	980.00
242	80	do	14.25	1,140.00
243	80	do	14.50	1,160.00
244	80	do	10.50	840.00
245	80	do	10.50	840.00
246	80	do	10.25	820.00
247	80	do	10.00	800.00
248	80	do	9.25	740.00
249	80	do	9.25	740.00
250	80	do	9.00	720.00
251	80	do	9.00	720.00
252	80	do	9.00	720.00
253	80	do	9.25	740.00
254	80	do	9.50	760.00
255	80	do	9.25	740.00
256	80	do	9.50	760.00
257	80	do	9.50	760.00
258	80	do	8.75	700.00
259	80	do	8.75	700.00
260	80	do	9.50	760.00
261	41	do	8.00	328.00
262	40	do	8.00	320.00
263	40	do	8.00	320.00
264	40	do	8.00	320.00
265	90	Small medium	14.25	1,282.50
266	45	do	14.00	630.00
267	45	do	14.50	652.50
268	45	do	13.75	618.75
269	44	do	14.25	627.00
270	30	do	13.75	412.50
271	90	Small medium; scarred, faulty, etc	10.25	922.50
272	90	do	6.50	585.00
273	90	do	6.75	607.50
274	90	do	7.50	675.00
275	60	do	8.25	495.00
276	40	do	11.50	460.00
277	40	do	7.00	280.00
278	46	III; 25 extra large, 21 large	1.00	46.00
279	70	III; large	3.75	262.50
280	86	III; 73 medium, 13 small medium	3.25	279.50
	8,307			138,619.00

99 MISCELLANEOUS PRIBILOF ISLANDS SKINS

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
282	3	Unhaired and dressed	$2.00	$6.00
283	13	Unhaired	.75	9.75
284	49	Partly unhaired	.50	24.50
285	34	Raw salted	.75	25.50
	99			65.75

Sale of fur-seal skins at St. Louis, Mo., September 15, 1930—Continued

1 CONFISCATED SKIN

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
281	1	Dressed in hair	$1.75	$1.75

Special sales of Pribilof Islands fur-seal skins in 1930

Date	Number of skins	Description	Price per skin	Total
		DRESSED, DYED, AND MACHINED		
Jan. 30	25	Dyed black, large	$42.36	$1,059.00
	25	Dyed logwood brown, large	34.64	866.00
Feb. 28	50	Dyed black, large	42.36	2,118.00
Dec. 1	90	Dyed logwood brown, large	34.64	3,117.60
	48	Dyed logwood brown, medium	26.48	1,271,04
	22	Dyed black, large	42.36	931.92
	88	Dyed black, medium	30.09	2,647.92
	348			12,011.48

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1930

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total price	Percentage
DYED BLACK										
Extra extra large:										
Sept. 15	I and II	3	$50.00	$50.00	$50.00	$150.00	6	$37.00	$222.00	0.05
	Scarred, faulty, etc	3	24.00	24.00	24.00	72.00				
Extra large:										
Apr. 7	I and II	29	50.00	49.50	49.95	1,448.50	50	39.47	1,973.50	0.63
	Scarred, faulty, etc	21	25.00	25.00	25.00	525.00				
Sept. 15	I and II	25	50.00	50.00	50.00	1,250.00	30	45.67	1,370.00	0.26
	Scarred, faulty, etc	5	24.00	24.00	24.00	120.00				
Large:										
Apr. 7	I and II	636	53.00	36.00	42.36	26,940.00	1,403	30.98	43,469.00	17.51
	Scarred, faulty, etc	766	25.00	20.00	21.57	16,525.00				
	III	1	4.00	4.00	4.00	4.00				
Sept. 15	I and II	880	48.00	40.00	44.74	39,367.50	2,100	31.13	65,368.50	17.99
	Scarred, faulty, etc	1,213	24.00	10.00	21.41	25,973.00				
	III	7	4.00	4.00	4.00	28.00				
Medium:										
Apr. 7	I and II	2,338	34.50	26.50	30.09	70,348.50	5,426	21.43	116,293.00	67.73
	Scarred, faulty, etc	3,060	17.00	12.75	14.98	45,832.50				
	III	28	4.00	4.00	4.00	112.00				
Sept. 15	I and II	3,480	25.50	18.00	21.95	76,380.00	8,244	16.68	137,534.00	70.61
	Scarred, faulty etc	4,733	15.00	10.00	12.89	61,030.00				
	III	31	4.00	4.00	4.00	124.00				
Small medium:										
Apr. 7	I and II	511	18.00	16.50	17.16	8,770.50	1,132	13.85	15,677.00	14.13
	Scarred, faulty, etc	610	11.75	10.50	11.25	6,862.50				
	III	11	4.00	4.00	4.00	44.00				
Sept. 15	I and II	510	15.00	13.50	14.28	7,282.50	1,295	11.44	14,811.00	11.09
	Scarred, faulty, etc	776	10.25	9.00	9.66	7,492.50				
	III	9	4.00	4.00	4.00	36.00				
All classes:										
Apr. 7							8,011	22.15	177,412.50	100.00
Sept. 15							11,675	18.78	219,305.50	100.00
DYED LOGWOOD BROWN										
Wig: Sept. 15	Scarred, faulty, etc	1	15.00	15.00	15.00	15.00	1	15.00	15.00	0.01
Extra extra large: Sept. 15	I and II	15	42.00	35.50	39.23	588.50	25	29.54	738.50	0.30
	Scarred, faulty, etc	10	15.00	15.00	15.00	150.00				

Extra large:										
Apr. 7	I and II	155	42.00	35.00	39.48	6,120.00	283	31.13	8,810.25	4.69
	Scarred, faulty, etc	119	28.00	20.00	22.29	2,652.00				
	III	9	4.25	4.25	4.25	38.25				
Sept. 15	I and II	44	42.00	35.50	38.94	1,713.50	235	19.27	4,528.50	2.83
	Scarred, faulty, etc	166	18.00	15.00	16.81	2,790.00				
	III	25	1.00	1.00	1.00	25.00				
Large:										
Apr. 7	I and II	1,280	49.00	29.25	34.64	44,340.00	2,252	27.78	62,558.50	37.32
	Scarred, faulty, etc	931	28.00	16.50	19.38	18,044.25				
	III	41	4.25	4.25	4.25	174.25				
Sept. 15	I and II	1,048	36.50	26.50	29.19	30,588.50	2,362	20.71	48,908.25	28.43
	Scarred, faulty, etc	1,223	20.00	12.00	14.75	18,036.25				
	III	91	3.75	1.00	3.12	283.50				
Medium:										
Apr. 7	I and II	1,735	29.50	24.00	26.49	45,953.75	3,207	20.80	66,693.75	53.14
	Scarred, faulty, etc	1,430	17.75	12.50	14.39	20,582.50				
	III	42	3.75	3.75	3.75	157.50				
Sept. 15	I and II	2,238	22.50	18.00	21.21	47,473.00	4,872	15.63	76,138.25	58.65
	Scarred, faulty, etc	2,561	15.00	8.00	11.10	28,428.00				
	III	73	3.25	3.25	3.25	237.25				
Small medium:										
Apr. 7	I and II	110	18.00	16.50	17.18	1,890.00	293	13.02	3,815.00	4.85
	Scarred, faulty, etc	175	12.50	10.25	10.83	1,895.00				
	III	8	3.75	3.75	3.75	30.00				
Sept. 15	I and II	299	14.50	13.75	14.12	4,223.25	812	10.21	8,290.50	9.78
	Scarred, faulty, etc	500	11.50	6.50	8.05	4,025.00				
	III	13	3.25	3.25	3.25	42.25				
All classes:										
Apr. 7							6,035	23.51	141,877.50	100.00
Sept. 15							8,307	16.69	138,619 00	100.00
MISCELLANEOUS										
Sept. 15	Unhaired and dressed	3	2.00	2.00	2.00	6.00	99	0.66	65.75	100.00
	Unhaired	13	.75	.75	.75	9.75				
	Partly unhaired	49	.50	.50	.50	24.50				
	Raw salted	34	.75	.75	.75	25.50				

DISPOSITION OF FUR-SEAL SKINS TAKEN AT PRIBILOF ISLANDS

On January 1, 1930, 50,745 fur-seal skins taken at the Pribilof Islands were on hand. Of these, 800 were at the Pribilof Islands, 49,934 at St. Louis, Mo., and 11 at Washington. In addition, 2 skins taken on St. Paul Island in the calendar year 1929 were unaccounted for, but they were later found to have been included in the shipment to St. Louis, making a total of 49,936 on hand at that place and a grand total of 50,747 skins. In 1930, 42,500 Pribilof Islands skins were secured at the islands and 34,487 were disposed of, leaving 58,760 on hand at December 31, 1930. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government-owned fur-seal skins under the control of the Department of Commerce.

Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1930

Source	On hand Jan. 1	Receipts in 1930	Disposed of in 1930	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1928	10, 668		[1] 10, 668	
Calendar year 1929	[2] 39, 268	800	[3] 23, 827	16, 241
Calendar year 1930		42, 500	[4] 3	42, 497
United States' share of Japanese fur-seal skins: Season of 1929		170		170
Confiscated fur-seal skins	4	3	[1] 5	2
Total	49, 940	43, 473	34, 503	58, 910

[1] Sold.

Includes 2 skins unaccounted for at close of 1929, but which were subsequently found when shipment was unpacked at St. Louis.

[3] 23,807 sold; 10 shipped to Washington for exhibition purposes; 10 used by U. S. Bureau of Standards in making a study of their physical properties.

[4] 2 used for replacing mounted skins borrowed by the Government for the Leipzig Exhibit and damaged in course of transportation; 1 shipped to Washington.

Summary of all fur-seal skins handled on Pribilof Islands, calendar year 1930

Island	On hand Jan. 1	Number taken	Total handled	Number shipped
St. Paul	500	34. 382	34, 882	34, 882
St. George	300	8, 118	8. 418	8, 418
Total	800	42, 500	43, 300	43, 300

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1930

Source	On hand Jan. 1				Receipts in 1930	Sales in 1930	Used for tests etc.[1]	On hand Dec. 31		
	Pribilof Islands	Fouke Fur Co.	Washington office	Total				Fouke Fur Co.	Washington office	Total
Taken on Pribilof Islands:										
Calendar year 1918, held for reference purposes	--------	--------	7	7	--------	--------	--------	--------	7	7
Calendar year 1923	--------	--------	3	3	--------	--------	--------	--------	3	3
Calendar year 1924	--------	--------	1	1	--------	--------	--------	--------	1	1
Calendar year 1928	--------	10,668	--------	10,668	--------	10,668	--------	--------	--------	--------
Calendar year 1929	800	[2] 39,268	--------	[2] 40,068	--------	23,807	10	16,241	10	16,251
Calendar year 1930	--------	--------	--------	--------	42,500	--------	2	42,497	1	42,498
Miscellaneous skins held for reference purposes	--------	--------	4	4	--------	--------	--------	--------	4	4
United States' share of Japanese sealskins, season of 1929	--------	--------	--------	--------	170	--------	--------	170	--------	170
Confiscated skins	--------	4	--------	4	3	5	--------	2	--------	2
Total	800	49,940	15	50,755	42,673	34,480	12	58,910	26	58,936

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[1] 10 skins under this category were used by the U. S. Bureau of Standards in making a study of their physical properties. Two skins were used for replacing mounted skins borrowed by the Government for the Leipzig Exhibit and damaged in course of transportation.

[2] Includes 2 skins unaccounted for at close of 1929, but which were subsequently found when shipment was unpacked at St. Louis.

SHIPMENT AND SALE OF FOX SKINS

The 193 blue and 31 white fox skins taken on St. Paul Island in the season of 1929–30, and the 552 blue and 1 white fox skins taken on St. George Island in the same season were placed aboard the *Penguin* for shipment and on May 31 reached Seattle, whence they were forwarded by express to the bureau's selling agents at St. Louis, Mo.

Of these skins, 375 blues and 32 whites were sold at public auction at St. Louis on September 15, 1930. The blue pelts brought $12,149.50, an average price of $32.40 per skin; and the white pelts brought $992, an average of $31 per skin. The maximum price per skin was $150, obtained for a blue pelt sold singly. Further details are given in the following tables:

Sale of 375 blue and 32 white fox skins at St. Louis, Mo., September 15, 1930

Lot No.	Number of skins	Trade classification	Price per skin	Total for lot
		BLUE-FOX SKINS		
500	1	Extra extra fine silvery	$150.00	$150.00
501	1	Extra fine silvery	125.00	125.00
502	1	Fine dark	110.00	110.00
503	2	I silvery	115.00	230.00
504	1	do	105.00	105.00
505	2	do	105.00	210.00
506	2	do	95.00	190.00
507	2	I pale silvery	77.50	155.00
508	2	do	87.50	175.00
509	1	I dark	80.00	80.00
510	3	do	75.00	225.00
511	3	I	75.00	225.00
512	2	II silvery	72.50	145.00
513	1	do	70.00	70.00
514	2	do	67.50	135.00
515	2	II pale silvery	57.50	115.00
516	1	II dark	67.50	67.50
517	4	II	56.00	224.00
518	4	do	40.00	160.00
519	4	do	48.00	192.00
520	5	do	37.00	185.00
521	4	do	36.00	144.00
522	1	do	37.00	37.00
523	2	do	44.00	88.00
524	2	II low	36.00	72.00
525	8	do	31.00	248.00
526	6	do	24.00	144.00
527	5	do	26.00	130.00
528	9	do	26.00	234.00
529	5	do	30.00	150.00
530	11	III	12.00	132.00
531	1	Fine silvery	132.50	132.50
532	1	Fine dark	85.00	85.00
533	2	I silvery	90.00	180.00
534	3	do	70.00	210.00
535	2	I dark	71.00	142.00
536	2	I	47.00	94.00
537	2	do	33.00	66.00
538	2	do	55.00	110.00
539	2	I pale	40.00	80.00
540	3	II silvery	28.00	84.00
541	3	II dark	34.00	102.00
542	3	do	32.00	96.00
543	5	do	36.50	182.50
544	3	II	39.00	117.00
545	4	do	28.00	112.00
546	7	do	25.00	175.00
547	8	do	28.00	224.00
548	6	do	25.50	153.00
		BLUE-FOX SKINS—continued		
549	8	II	27.00	216.00
550	4	do	34.50	138.00
551	11	II low	27.50	302.50
552	9	do	18.50	166.50
553	7	do	18.50	129.50
554	12	do	18.50	222.00
555	8	do	19.50	156.00
556	5	do	20.50	102.50
557	7	do	19.50	136.50
558	8	III	13.00	104.00
559	1	Fine silvery	87.50	87.50
560	1	I silvery	82.50	82.50
561	2	do	100.00	200.00
562	2	do	65.00	130.00
563	2	I dark	45.00	90.00
564	1	I	35.00	35.00
565	2	do	37.50	75.00
566	2	do	43.00	86.00
567	2	I rusty	25.50	51.00
568	4	II silvery	41.00	164.00
569	2	II dark	33.50	67.00
570	3	do	33.00	99.00
571	5	do	28.00	140.00
572	6	II	22.00	132.00
573	5	do	24.00	120.00
574	6	do	30.00	180.00
575	6	do	29.50	177.00
576	9	do	27.00	243.00
577	5	do	23.00	115.00
578	4	do	31.00	124.00
579	9	II low	20.00	180.00
580	7	do	17.50	122.50
581	10	do	16.50	165.00
582	8	do	18.00	144.00
583	10	do	22.00	220.00
584	10	do	17.00	170.00
585	5	do	14.00	70.00
586	9	IV	1.00	9.00
	375			12,149.50
		WHITE-FOX SKINS		
587	16	I & II	30.00	480.00
588	16	do	32.00	512.00
	32			992.00
	407			13,141.50

FUR-SEAL PATROL

UNITED STATES COAST GUARD

Five cutters—the *Haida*, *Unalga*, *Snohomish*, *Northland*, and *Chelan*—were assigned by the United States Coast Guard to take part in the patrol for the protection of the fur seals and sea otters in waters of the North Pacific Ocean and Bering Sea.

The *Snohomish* began to patrol off the mouth of Columbia River on April 5 and covered the area as far north as Dixon Entrance until May 18. The *Unalga* patrolled from Dixon Entrance northward and westward to Unalaska and then took part in the general patrol in the Bering Sea region. The *Haida* and *Chelan* sailed from Seattle for Unalaska in April and June, respectively, patrolling en route and thereafter maintaining the patrol in Bering Sea and around the Pribilof Islands. While on its annual trip to the Arctic Ocean from San Francisco the *Northland* patrolled waters frequented by the fur seals. The season's patrol extended as far westward as Attu, the westernmost island of the Aleutian chain, and was prosecuted as long as the circumstances required.

BUREAU OF FISHERIES

From the early part of April until the end of May the *Brant* patrolled the waters in the vicinity of Cape Flattery. Supplementing the patrol work by keeping a check on the native hunters when leaving and returning to land, a representative of the Bureau of Fisheries was stationed at La Push to enforce the regulations with respect to prohibition of the use of firearms and motors in connection with the taking of fur-seal skins. The *Petrel* was engaged in seal patrol in the vicinity of Sitka in April and May.

SEALING PRIVILEGES ACCORDED ABORIGINES

The North Pacific Sealing Convention of July 7, 1911, provides that Indians and other aborigines dwelling on the coasts of the waters designated by the convention may take fur-seal skins under limited conditions. During the year 1930 there were taken and duly authenticated by officials of the respective Governments 2,832 fur-seal skins, of which 535 were taken by Indians under the jurisdiction of the United States and 2,297 by Indians of Canada. Reports have also been received of the authentication of 101 additional skins, 17 from male and 84 from female fur seals, taken in 1929 by Indians of the State of Washington. These, together with the number previously reported make a total of 1,687 skins taken in that year by Indians under the jurisdiction of the United States. The details for 1930 are as follows:

Washington.—A total of 450 skins taken by the Indians of Washington were authenticated. Of these, 131 were from male seals and 319 from females. The skins were taken by Indians of La Push and Neah Bay and in the months from January to July, both inclusive. Dr. Carl B. Boyd, superintendent of the Neah Bay Indian Agency, Neah Bay, Wash., authenticated the skins.

Alaska.—Eighty-five skins taken by natives of Sitka were authenticated by bureau employees, Assistant Agent M. J. O'Connor and Warden Harry A. Pryde. Of these skins, 29 were reported to be from male seals, 31 from females, and 25 from unborn pups. The seals from which the skins were secured were taken in waters off Biorka Island in the month of May.

British Columbia.—An official report received by the bureau stated that a total of 2,297 fur-seal skins were taken by the local Indians off the British Columbia coast during 1930.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

The North Pacific Sealing Convention of July 7, 1911, provides that 10 per cent of the fur-seal skins taken annually upon Robben Island or any other islands or shores of waters defined by the convention subject to the jurisdiction of Japan shall be turned over to the United States Government unless the number of seals frequenting the Japanese islands falls below 6,500, enumerated by official count.

The United States Government's share of fur-seal skins taken by the Japanese Government in 1930 was 172. They were received by the department's selling agents at St. Louis, Mo., in January, 1931.

INTERNATIONAL FUR-TRADE EXHIBITION AT LEIPZIG

A joint resolution of Congress, approved by the President on March 21, 1930, provided for participation by the United States in the International Fur-Trade Exhibition at Leipzig, Germany, from May 31 to September 30, 1930. The Departments of Agriculture and Commerce cooperated in the preparation of exhibit material, that of the latter department having to do principally with the fur-seal resources of the Pribilof Islands. The showing of the Bureau of Biological Survey featured the constructive efforts of that organization along the line of conserving the country's fur resources. The display of the United States was primarily educational in character.

Among the items assembled by the Bureau of Fisheries were a group of mounted fur seals, a number of dyed fur-seal skins in the standard black and logwood-brown colors, blue-fox and white-fox pelts, mounted blue foxes, and two coats made from Pribilof Islands sealskins. Illuminated transparencies and other pictures of the bureau's fur-seal and foxing activities were shown. There was also an interesting portrayal of what has been accomplished since 1911 by international cooperation in saving and rebuilding the fur-seal herd of Alaska.

All matters in respect to the preparation and installation of the entire exhibit were admirably handled by the Office of Exhibits, Department of Agriculture. Edward M. Ball, of the bureau's staff, was detailed to that organization and was at Leipzig throughout the exhibition.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1930

By Harry J. Christoffers

The large number of surplus bulls observed on hauling grounds, the favorable ratio of idle to harem bulls, the increased number of 3-year-olds available for killing, and the large number of 2 and 3 year olds observed after the cessation of commercial operations, when considered as a whole, indicate that the seal herd of the Pribilof Islands is in a very satisfactory condition.

During the summer sealing season of 1929 there were killed at the Pribilof Islands 38,079 3-year-old male seals. This was an increase of approximately 33 per cent over the previous season. Some question arose, therefore, as to whether this was an extremely favorable year due to less severe conditions at sea, causing a lower mortality rate for that particular generation of seals, or whether it was due to a natural recovery on account of a larger branded reserve. It was felt by many that it would not be possible to equal or at least to exceed the killings of 1929 during 1930. Applying an average rate of increase of 8 per cent to the number of 3-year-old males killed and to the estimated reserve in 1929 would make 41,123 killable 3-year-old male seals and 14,730 of the same class to be reserved in 1930.

There were actually killed at the Pribilof Islands during the summer sealing season of 1930, 41,409 3-year-old males. In addition there were marked and reserved for breeding purposes 6,539 3-year-old males, making a total of 47,948 3-year-old males actually handled out of the estimated total of 56,280 credited to the islands. This makes an actual estimated reserve of 14,871 to be compared with 14,730, the number needed to provide an increase of 8 per cent over the previous season's estimated requirements.

The 3-year-old male seals were comparatively slow in appearing this season, but arrived in larger numbers than usual toward the end of the season. A great many unmarked 3-year-olds were observed on the hauling grounds after killing and reserving operations had been discontinued. It was, therefore, evident that a sufficient number of animals had been reserved to amply take care of breeding requirements.

BULLS

A census of harem and idle bulls was taken on St. Paul Island between July 15 and July 20, inclusive, and on St. George Island between July 21 and July 24, inclusive. On St. George Island, A. J. Messner and C. M. Hoverson counted Zapadni and South rookeries. All other rookeries, on both islands, were counted simultaneously by A. Christoffersen and the writer. A double check of the number of animals on each rookery was therefore secured, thus minimizing the possibility of error.

It was again impossible to count Sivutch rookery on Sea Lion Rock. To continue indefinitely to increase the number of harems, and to continue to apply the average rate of increase for cows and pups will, in time, result in crediting to this rookery a much greater number of animals than could possibly crowd into such a small area. The surplus bulls, cows, and pups which would normally be credited to this area must of necessity move to other rookeries. For the present, or until weather conditions permit an actual count, it seems best to continue this method rather than to spread the increase over the various rookeries on St. Paul Island; though this may, in time, show too great a number of animals on Sivutch, it will not change the proportionate increase in the total number of animals in the herd.

On South rookery, St. George Island, the number of harems continued to increase to such an extent that even though the number of cows increased at the normal rate the average harem for this rookery has been reduced to 6.41. As a matter of fact, the number of cows on this rookery has increased at a much greater rate than 8 per cent, even though this figure still applies to the increase of the herd as a whole. South rookery has apparently increased at the expense of all other rookeries on St. George Island.

Though there was an expansion of harem areas this season, it was not to such a great extent as during the previous two years. Instead there was a considerable increase in the number of harems in the areas previously occupied. The seals prefer to huddle together as thickly as possible until it is absolutely necessary to move farther back from the more densely populated portions of the rookery.

It is very noticeable that there is less fighting and less viciousness among the bulls in densely populated areas. The bulls in these areas pay comparatively little attention to the cows, while the bulls on sparsely populated areas or in places where there is a single small harem are continually worrying the cows. A harem on the edge of Ardiguen rookery, considerably separated from the main harem area, contained seven cows all badly mutilated by the bull to such an extent that it was doubtful whether four of the cows would survive. To a more or less extent this is true of all single harems or in sparsely populated areas. It is surprising how little serious fighting actually occurs in thickly populated areas.

With a large number of idle and surplus bulls it would seem that considerable serious fighting would occur. There is the usual amount of bullying, but in proportion to the number of animals present there is no more serious fighting with the present number of idle bulls than occurred when there was an actual shortage of bulls. There is comparatively no more fighting on rookeries where there is a surplus of bulls than occurs on rookeries where there is a shortage of bulls.

In the early part of the season there is a surplus of bulls attached to each rookery. All of these idle bulls do not, however, go on the rookeries proper and take positions at the same time. Sufficient numbers, however, assume positions to take care of the early onrush of cows. Later, as the early populated portions fill up and the rookery area expands, more and more of the surplus bulls will attach themselves to a rookery and become idle and then harem bulls. These surplus and idle bulls do not cause any particular trouble to the harem bulls. They seem to know that the harem areas will later expand sufficiently to provide for their wants. Surplus bulls do, however, wander continuously from one rookery to another or from one portion of a rookery to another looking for favorable positions. If there are a number of idle bulls between them and the harems, they find what appears to be a favorable place near a bull that has accumulated a harem.

It is interesting to note that even during the time when the bull census is taken, there is a large number of robust, husky older bulls on the hauling grounds while good-sized harems are held by considerably younger bulls. Now and then, one will see a small, pugnacious 7 or 8 year old bull holding a good-sized harem.

During the period when the census was taken, a number of iron-branded 10-year-old bulls (branded 1923) were still to be found among the surplus bulls on the hauling grounds.

The large number of surplus bulls appearing on hauling grounds during the period when the census of bulls was taken, indicated that the herd is in an extremely healthful condition and that ample males have been reserved for breeding purposes. These bulls are required to take care of the virgin cows. It might appear to the casual observer that more have been reserved than necessary, but when it is considered that approximately 72,000 virgin females were due at the islands this season, it is felt that the number of surplus bulls on hand is not more than required. The harem bulls which have been on duty from the beginning of the season should not be considered as available for this purpose. At best it is not desirable to depend on the harem bulls as being virile at this late date.

The surplus bulls, without a doubt, cause considerable trouble in drives, especially during the first half of the season, but they must be considered as a necessary evil. If the surplus bulls are on hand, the older harem bulls will retire at the proper time; if the surplus bulls are not on hand, the harem bulls will continue to attempt to take care of virgins and late-arriving females long after they have become exhausted through the long vigils of harem life. They are then not in condition to move about as actively as the surplus bulls which are still in good physical condition.

During the breeding period, the cows all go on the rookeries to have their pups, but the virgins are just as likely to haul out and be bred on a hauling ground as on a rookery. Therefore it is necessary for the bulls taking care of the virgins to continually move around over a large area while the harem bull maintains vigil over a very small area.

Number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1930

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi	July 19	302	56	358	1:5	36.37
Lukanin	do	109	33	142	1:3	48.72
Gorbatch	July 16	617	147	764	1:4	45.20
Ardiguen	do	77	17	94	1:5	34.26
Reef	do	1,127	264	1,391	1:4	49.71
Sivutch (estimated)		390	85	475	1:5	43.95
Lagoon (actual count)	July 15	2	1	3	1:2	56.50
Tolstoi	July 19	729	153	882	1:5	45.24
Zapadni	July 20	581	131	712	1:4	54.55
Little Zapadni	do	359	78	437	1:5	45.00
Zapadni Reef	do	29	7	36	1:4	19.34
Polovina	July 17	418	93	511	1:4	27.25
Polovina Cliffs	do	204	61	265	1:3	30.57
Little Polovina	do	96	27	123	1:4	23.65
Morjovi	July 18	226	59	285	1:4	18.06
Vostochni	do	1,557	343	1,900	1:5	29.19
Total		6,823	1,555	8,378	1:4	39.70
St. George Island:						
North	July 21	478	104	582	1:5	46.24
Staraya Artil	do	354	87	441	1:4	47.04
Zapadni	July 24	144	48	192	1:3	16.32
South	July 21	86	18	104	1:5	6.41
East Reef	do	134	31	165	1:4	37.80
East Cliffs	do	293	56	349	1:5	49.35
Total		1,489	344	1,833	1:4	41.09
Total (both islands)		8,312	1,899	10,211	1:4	39.95

AVERAGE HAREM

The estimated average harem for St. Paul Island (39.70) shows a decrease of 2.12; for St. George Island (41.09) a decrease of 6.55; and for the two islands (39.95) a decrease of 2.83, as compared with the averages for the preceding year. This very satisfactory decrease for

St. George Island now brings the average harem for both islands down to what most authorities consider approximately the correct figure. It is hoped that this condition will remain about constant.

Knowing the number of harems, the average size of each has been determined on the basis of an average increase of 8 per cent for cows. The increase for each particular rookery will vary considerably from year to year, but the average rate of increase for the islands as a whole will remain about constant. The average increase and the average harem for each rookery may therefore vary considerably from year to year and may be far from correct for any given rookery, but will be about right for all the rookeries on both islands. A sharp increase or decrease in the number of harems on any given rookery will be compensated for by a sharp decrease or increase on the other rookeries.

Computation of breeding cows, based on annual increase of 8 per cent, and of average harems, in 1930

Rookery	Breeding cows		Harem bulls, 1930	Average harem		
	1929	1930		1930	1929	Increase (+) or decrease (−) in 1930 from 1929
St. Paul Island:						
Kitovi	10, 170	10, 984	302	36. 37	39. 11	−2. 74
Lukanin	4, 917	5, 310	109	48. 72	47. 28	+1. 44
Gorbatch	25, 823	27, 889	617	45. 20	50. 93	−5. 73
Ardiguen	2, 443	2, 638	77	34. 26	50. 89	−16. 63
Reef	51, 870	56, 020	1, 127	49. 71	46. 19	+3. 52
Sivutch	15, 872	17, 142	390	43. 95	42. 32	+1. 63
Lagoon (actual count pups)	112	113	2	56. 50	56. 00	+. 50
Tolstoi	30, 535	32, 978	729	45. 24	56. 23	−10. 99
Zapadni	29, 345	31, 693	581	54. 55	60. 38	−5. 83
Little Zapadni	14, 958	16, 155	359	45. 00	50. 03	−5. 03
Zapadni Reef	519	561	29	19. 34	19. 22	+. 12
Polovina	10, 545	11, 389	418	27. 25	30. 65	−3. 40
Polovina Cliffs	5, 774	6, 236	204	30. 57	30. 55	+. 02
Little Polovina	2, 103	2, 271	96	23. 65	38. 94	−15. 29
Morjovi	3, 780	4, 082	226	18. 06	22. 77	−4. 71
Vostochni	42, 078	45, 444	1, 557	29. 19	28. 60	+. 59
Total	250, 844	270, 905	6, 823	39. 70	41. 82	−2. 12
St. George Island:						
North	20, 464	22, 101	478	46. 24	47. 48	−1. 24
Staraya Artil	15, 419	16, 653	354	47. 04	47. 74	−. 70
Zapadni	2, 176	2, 350	144	16. 32	23. 65	−7. 33
South	510	551	86	6. 41	10. 62	−4. 21
East Reef	4, 690	5, 065	134	37. 80	47. 86	−10. 06
East Cliffs	13, 388	14, 459	293	49. 35	67. 96	−18. 61
Total	56, 647	61, 179	1, 489	41. 09	47. 64	−6. 55
Total (both islands)	307, 491	332, 084	8, 312	39. 95	42. 78	−2. 83

PUPS AND COWS

Pup counts of 1917 and 1922 showed an average rate of increase of 8 per cent. The large number of seals on the rookeries made it impracticable to continue making a pup count on all rookeries thereafter. The average rate of increase as determined from the beforementioned counts has therefore been used continuously since 1923. Pup counts could still be made on the smaller rookeries; but as there are innumerable factors which enter into a varying increase or decrease of any particular rookery but which do not prevent the average increase of the herd as a whole, it would be extremely confusing to make pup counts of the smaller rookeries only. It is also a well-known fact that densely populated rookeries increase faster than those sparsely populated and that the rookery or island on which a seal is born has no bearing on the place it may haul out thereafter. It is also true that the rate of increase varies considerably from year to year, so the average rate of increase must be based on the total increase over a term of years.

The number of dead pups can also only be estimated, and the percentage found in the count of 1922 therefore has been applied to each rookery. For comparative purposes it is necessary to include the estimated number of dead pups in the total number of pups.

By inference, the number of cows is the same as the number of pups, as a female seal gives birth to but one pup each year.

On Polovina rookery there was observed a cow bearing a brand of the 1912 series. In that year some 5,000 pups, male and female, had been marked with a hot iron shaped like the letter T and applied to the top of the head.

Distribution of pups on the Pribilof Islands, August 10, 1930, and comparison with distribution in 1929

Rookery	1930				1929	1930
	Living pups	Dead pups	Total pups	Per cent dead pups	Total pups	Increase
St. Paul Island:						
Kitovi	10, 823	161	10, 984	1. 47	10, 170	814
Lukanin	5, 195	115	5, 310	2. 17	4, 917	393
Gorbatch	27, 649	240	27, 889	. 86	25, 823	2, 066
Ardiguen	2, 575	63	2, 638	2. 39	2, 443	195
Reef	55, 202	818	56, 020	1. 46	51, 870	4, 150
Sivutch	16, 724	418	17, 142	2. 44	15, 872	1, 270
Lagoon (actual count)	113		113		112	1
Tolstoi	32, 520	458	32, 978	1. 39	30, 535	2, 443
Zapadni	31, 148	545	31, 693	1. 72	29, 345	2, 348
Little Zapadni	15, 751	404	16, 155	2. 50	14, 958	1, 197
Zapadni Reef	557	4	561	. 80	519	42
Polovina	11, 215	174	11, 389	1. 53	10, 545	844
Polovina Cliffs	6, 121	115	6, 236	1. 85	5, 774	462
Little Polovina	2, 214	57	2, 271	2. 51	2, 103	168
Morjovi	4, 000	82	4, 082	2. 02	3, 780	302
Vostochni	44, 499	945	45, 444	2. 08	42, 078	3, 366
Total	266, 306	4, 599	270, 905	1. 70	250, 844	20, 061
St. George Island:						
North	21, 792	309	22, 101	1. 40	20, 464	1, 637
Staraya Artil	16, 223	430	16, 653	2. 58	15, 419	1, 234
Zapadni	2, 324	26	2, 350	1. 12	2, 176	174
South	542	9	551	1. 72	510	41
East Reef	4, 989	76	5, 065	1. 51	4, 690	375
East Cliffs	14, 244	215	14, 459	1. 49	13, 388	1, 071
Total	60, 114	1, 065	61, 179	1. 74	56, 647	4, 532
Total (both islands)	326, 420	5, 664	332, 084	1. 71	307, 491	24, 593

MORTALITY OF SEALS AT SEA

The mortality rates used this season for computing the number of seals in the herd, are the same as used in the estimate for 1929. The mortality at sea varies considerably from year to year. The percentages of loss or natural death rates as used in this season's computation will answer all practical purposes until abnormal conditions are noted.

To fully understand methods of computation and reasons for applying various mortality rates, it is necessary to consider census estimates for the past several years. These figures show reasons for making changes in mortality rates from year to year. It will not be necessary to reiterate these changes at this time, but the reader will find more complete data in the corresponding annual reports for 1928 and 1929.

COMPLETE COMPUTATION

Following is a summary of computations of the number of animals in the Pribilof Islands fur-seal herd in 1930, together with a recapitulation of the herd by classes. It will be noted that the increase in the total number of seals over 1929 was 73,574, or 7.57 per cent. The increase in 1929 over 1928 was 100,014, or 11.48 per cent. This large increase in 1929 was due to a readjustment of figures for previous years on account of additional information secured regarding mortality rates of seals at sea.

Complete computation of fur seals, Pribilof Islands, as of August 10, 1930

Class	St. Paul Island	St. George Island	Total
Pups, estimated	270, 905	61, 179	332, 084
Breeding cows, 3 years old and over, by inference	270, 905	61, 179	332, 084
Harem bulls, counted	6, 823	1, 489	8, 312
Idle bulls, counted	1, 555	344	1, 899
Yearlings, male and female, estimated:			
Females born in 1929	125, 422	28, 323	153, 745
Natural mortality, 40 per cent	50, 169	11, 329	61, 498
Yearling females, Aug. 10, 1930	75, 253	16, 994	92, 247
Males born in 1929	125, 422	28, 324	153, 746
Natural mortality, 40 per cent	50, 169	11, 330	61, 499
Yearling males beginning 1930	75, 253	16, 994	92, 247
Yearling males killed 1930	15	----------	15
Yearling males, Aug. 10, 1930	75, 238	16, 994	92, 232
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1929	69, 682	15, 735	85, 417
Natural mortality, 15 per cent	10, 452	2, 360	12, 812
2-year-old females, Aug. 10, 1930	59, 230	13, 375	72, 605
Yearling males, Aug. 10, 1929	69, 645	15, 736	85, 381
Yearling males killed fall 1929	----------	----------	----------
Yearling males end of 1929	69, 645	15, 736	85, 381
Natural mortality 17.5 per cent	12, 188	2, 754	14, 942
2-year-olds beginning 1930	57, 457	12, 982	70, 439
2-year-olds killed 1930	712	53	765
2-year-old males, Aug. 10, 1930	56, 745	12, 929	69, 674
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1929	52, 404	11, 950	64, 354
2-year-old males killed fall 1929	23	10	33
2-year-old males end of 1929	52, 381	11, 940	64, 321
Natural mortality, 12.5 per cent	6, 548	1, 493	8, 041
3-year-old males beginning 1930	45, 833	10, 447	56, 280
3-year-old males killed 1930	33, 393	8, 016	41, 409
3-year-old males, Aug. 10, 1930	12, 440	2, 431	14, 871

Complete computation of fur seals, Pribilof Islands, as of August 10, 1930—Con.

Class	St. Paul Island	St. George Island	Total
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1929	10,513	3,126	13,639
3-year-old males killed fall 1929	477	289	766
3-year-old males end of 1929	10,036	2,837	12,873
Natural mortality, 10 per cent	1,004	284	1,288
4-year-old males beginning 1930	9,032	2,553	11,585
4-year-old males killed 1930	227	31	258
4-year-old males, Aug. 10, 1930	8,805	2,522	11,327
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1929	(1)	(1)	9,102
4-year-old males killed fall 1929			
4-year-old males end of 1929			9,102
Natural mortality, 10 per cent			910
5-year-old males beginning 1930			8,192
5-year-old males killed 1930	1		1
5-year-old males, Aug. 10, 1930			8,191
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1929	(1)	(1)	7,016
5-year-old males killed fall 1929			
5-year-old males end of 1929			7,016
Natural mortality, 20 per cent			1,403
6-year-old males beginning 1930			5,613
6-year-old males killed 1930	1		1
6-year-old males, Aug. 10, 1930			5,612
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1929	(1)	(1)	10,399
6-year-old males killed fall 1929			
6-year-old males end of 1929			10,399
Natural mortality, 20 per cent			2,080
7-year-old males beginning 1930			8,319
7-year-old males killed 1930			
7-year-old males, Aug. 10, 1930			8,319
Surplus bulls, Aug. 10, 1929	5,164	43	5,207
Natural mortality, 30 per cent	1,549	13	1,562
Remaining surplus for 1930	3,615	30	3,645
Breeding bulls of 1929	7,337	1,483	8,820
Natural mortality, 30 per cent	2,201	445	2,646
1929 bulls remaining 1930	5,136	1,038	6,174
Breeding bulls 1930	8,378	1,833	10,211
1929 bulls remaining, deducted	5,136	1,038	6,174
Increment of new bulls in 1930	3,242	795	4,037
7-year-old males computed for 1930			8,319
Surplus bulls computed for 1930	3,615	30	3,645
Total theoretical bull stock, 1930	(1)	(1)	11,964
New increment of breeding bulls deducted	(1)	(1)	4,037
Surplus bulls in 1930	(1)	(1)	7,927
50 per cent deducted for losses due to fighting, natural causes, and errors in loss percentage in previous years			3,964
Surplus bulls, Aug. 10, 1930			3,963

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[1] It has not been practicable to work out estimates in certain cases showing the approximate number of seals of each class which should be credited to each island. Seals do not haul out in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the two islands. The total for both islands is, however, approximately correct.

Complete computation of fur seals, Pribilof Islands, as of August 10, 1930—Con.

RECAPITULATION

Class	Total	Class	Total
Pups	332,084	5-year-old males	8,191
Cows	332,084	6-year-old males	5,612
Harem bulls	8,312	Surplus bulls	3,963
Idle bulls	1,899		
Yearling females	92,247	Total, 1930	1,045,101
Yearling males	92,232		
2-year-old females	72,605	Total, 1929	971,527
2-year-old males	69,674	Numerical increase, 1930	73,574
3-year-old males	14,871	Per cent increase, 1930	7.57
4-year-old males	11,327		

FISHERIES INDUSTRIES OF THE UNITED STATES, 1930[1]

By R. H. FIEDLER

Chief, Division of Fishery Industries

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FOREWORD

This report constitutes an annual review on fishery statistics of the United States as well as a summary of activities of the division of fishery industries. As its name indicates, this division of the bureau is concerned with the activities and welfare of the fishery industries, including the commercial fisheries, the trade in fishery products, and the fish canning and preserving industries. Its functions are the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed to solve the technical problems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in Part 2 of this report, which includes all the detailed statistical information that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. There is included a summary of the catch of fishery products in the United States for the half century from 1880 to 1929. In the preparation of this report numerous members of the division's staff have taken part and their assistance is appreciatively acknowledged.

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[1] Appendix II to the Report of the U. S. Commissioner of Fisheries, 1931. Approved for publication, June 8, 1931.

Part 1. OPERATIONS OF THE DIVISION

COLLECTION OF STATISTICS

The statistical work of the division in 1930, as in former years, included the collection and dissemination of statistics on the catch of fishery products and the gear employed in making the catch and statistics of related fishery industries. In the former group are those statistics that are intended for the use of the fishery biologist, upon which to base conservation measures. They are also valuable for economic purposes. This is especially true of statistics for the landings of fish at principal fishing ports, which are published monthly. In the second group are statistics that are of use mainly for economic or trade purposes. These include statistics of the manufactured fishery products and by-products of the United States, cold-storage holdings of fish and amounts of fish frozen in the United States, marine-animal oil production, and similar statistics.

During 1930 unusual progress was made in the collection of statistics of the catch of fishery products in the United States. This has been occasioned by greater cooperation with State fishery agencies and by the extended use of automobiles by agents, which has enabled them to canvass a larger territory than was formerly the case when travel was performed mainly by train. As a result, catch statistics for 1929 were obtained of the fisheries in our New England, Middle Atlantic, Chesapeake Bay, South Atlantic, Gulf, Pacific Coast, and Great Lakes States. Continuous annual catch statistics are now available for the Great Lake States from 1913, Pacific Coast States from 1922, South Atlantic and Gulf States from 1927, New England States from 1928, Middle Atlantic and Chesapeake Bay States starting with 1929 (as it is now planned to canvass the latter States annually), and the State of Connecticut from 1924. Catch statistics are now available on each geographical section for 1929 except for the Mississippi River area and its tributaries. The latest complete statistics for this section are for 1922. However, annual canvasses are made here for the catch of fresh-water mussels, and also for the catch of fish in Lakes Pepin and Keokuk, and that part of the Mississippi River between these two lakes.

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[2] Fishery Industries of the United States, 1929. By R. H. Fiedler, Appendix XIV to the Report of the U. S. Commissioner of Fisheries for 1930, pp. 705-1068. Bureau of Fisheries Document No. 1095.

In addition to the general catch statistics, the collection and (or) publication of statistics on special subjects was continued during 1930, as follows: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Me., and Seattle, Wash.; landings of halibut at North Pacific coast ports (published monthly, and annual bulletins summarizing these landings for the year); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of manufactured fishery products and by-products of the United States and Alaska during 1930; the catch of shad in the Potomac and Hudson Rivers and the catch of alewives in the Potomac River during 1930; transactions on the sponge exchange at Tarpon Springs, Fla., during 1930; volume of fishery products handled at the municipal fish wharf and market, Washington, D. C., during 1930; and the volume of United States imports and exports of fishery products during 1930, furnished by the Bureau of Foreign and Domestic Commerce.

CATCH ANALYSIS—COLUMBIA RIVER CHINOOK SALMON FISHERY

The analysis of the Chinook salmon catch records of individual fishermen on the Columbia River, which is being conducted to determine the catch per constant unit of effort and gear during the years from 1909 to 1930, inclusive, was carried on as outlined in last year's report of the Division of Fishery Industries, "Fishery Industries of the United States, 1929" by R. H. Fiedler, Appendix XIV to the Report of the United States Commissioner of Fisheries for 1930, pp. 705–1068, Bureau of Fisheries Document No. 1095. The purpose of this investigation is to determine a satisfactory index of relative abundance and fluctuations in number of the population of Chinook salmon spawning in the Columbia River.

During the summer of 1930 data were collected consisting of additional records of catches made in the lower river near Astoria from 1909 to 1930, inclusive; records of fish wheel catches from the territory near Warrendale; and information regarding types of gear and boats that have been used in this fishery during the period of time covered by this analysis. The catch records secured from the lower portion of the river indicate that the previous data collected at Astoria constitute an adequate sample of the daily boat catches of that region. From these combined groups of records a reliable index of abundance should be obtained, which will indicate fluctuations in numbers of the total spawning population of each year and of the biologically distinct portions or "runs" of the various years.

The records of the daily catches of the fish wheels at Warrendale, represent a very valuable addition to our records. They provide an index of abundance of the salmon at the point farthest up the river where commercial fishing of any great importance is carried on. It is possible that upon analysis they may yield a reliable record of relative escapement of salmon from the gear in the lower river.

The information secured concerning the types of gear used (the entire analysis has been confined to the records of gill net fishermen and the fish wheel records mentioned above) indicates that during the first six or eight years covered by our data, 1909 to about 1916, there was a steady improvement in the efficiency of the nets. Also it was during the same period that the sail boats became obsolete and boats powered with gasoline engines came into practically universal use in this fishery.

These two factors undoubtedly increased the catch per unit of effort and gear during that time when the change was taking place and must be seriously considered in interpreting the final curves of relative abundance.

The additional data collected during 1930 confirms the conclusions drawn from the previously gathered records: That from 1909 to 1925, the trend of catch per unit of effort and gear was approximately constant and that from 1925 to 1930 it has dropped at an alarming rate.

TECHNOLOGICAL INVESTIGATIONS

Fisheries technology covers a very wide field of activity, in that it deals with an important food industry and sources of valued products in the arts and industries. The study of the technology of many food industries is an extensive subject and few, if any, food industries are as highly diversified as the fishery industries. Fisheries technology is at present demanding the attention and best efforts of chemists, engineers, and bacteriologists. Until a few years ago little had been accomplished in this field of food technology. Much remains yet to be accomplished. The Bureau of Fisheries, the College of Fisheries of the University of Washington, Seattle, Wash., and some of the larger fishery companies have been the leaders in this field. Developments have come very rapidly in recent years. The technical handling, preservation, and distribution of foods through the medium of refrigeration, particularly to inland consumers, has been largely a result of research activities in fisheries technology. Great progress has been made in the elimination of waste in the fishery industries. The enormous strides in the manufacture and uses of marine by-products are a real contribution to the science of animal nutrition. In fact, progress in some branches of fisheries technology, described in detail in the following pages, has been so great that other food industries are looking to this industry for guidance.

BY-PRODUCTS AND PRODUCTION METHODS

THE MENHADEN INDUSTRY

For years fish scrap and fish oil have been established by-products of the fishing industry. Until recently, however, they were looked upon as low-grade materials. Fish scrap was manufactured and sold for use in fertilizer compounds and fish oil was marketed solely as a cheap substitute for other oils used by several technical industries. Within the past few years, largely through the efforts of the Bureau of Fisheries and certain enterprising individuals associated with the fish scrap and fish oil industry these products have become recognized as possessing greater potential usefulness. Investigation has shown that properly prepared ground-fish meal is a valuable animal feedstuff and carefully rendered oils have increased value for technical use and that certain of them possess sufficient vitamin A and D potency to warrant their use in animal feeding.

Fishery by-products of the type manufactured in the past are decreasing in usefulness as competitive industries have progressed. Fishery by-products of improved quality have at least kept pace with competitive products and in some cases have gained increased prestige and even greater value.

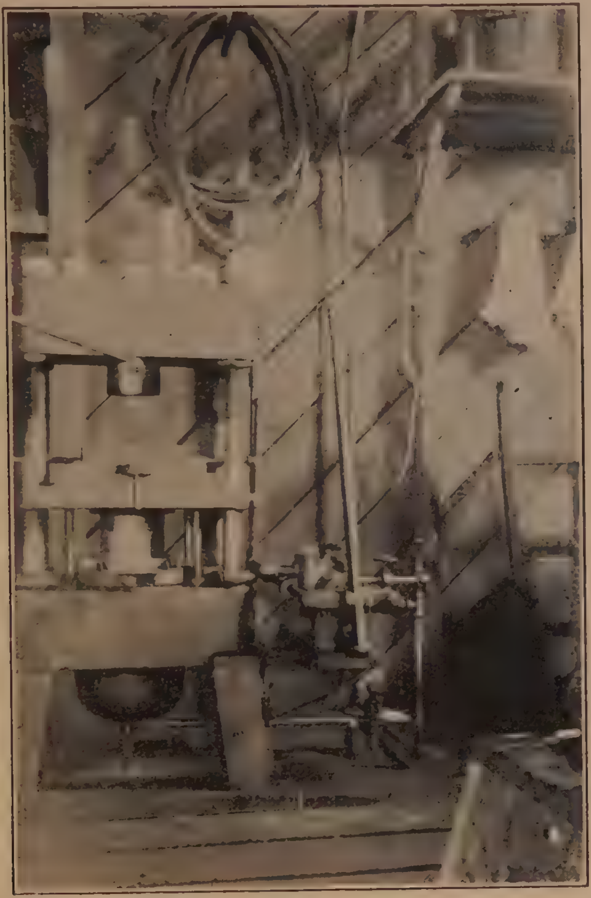

FIGURE 1.—Laboratory press used in connection with studies in menhaden industry

During the past year the bureau's technologists completed an extended study of the menhaden industry, a summary of the findings follows:

(1) The bilge water from a menhaden steamer generally contains sufficient oil to warrant recovery at the factory.

(2) Most efficient operation from a continuous screw press may be expected when (*a*) the liquors are not required to traverse a great thickness of press cake, (*b*) the pressure is increased slowly, and (*c*)

sufficient time is given to permit the liquors from the center of the cake to reach the outer surfaces.

(3) The continuous screw press extracts a greater portion of oil and water from cooked menhaden than any of several types of centrifugal equipment tested.

(4) Menhaden press liquors contain approximately 22 per cent of the total solids of the original material. Of this amount about 17 per cent is dissolved materials and about 5 per cent is suspended material.

(5) Under present operating conditions all dissolved materials are discarded and only about one-third of the suspended materials are recovered.

(6) In the separation of the oil from the press liquors only about 90 per cent of the oil is recovered as first-grade oil, about 2 per cent is lost, and the remaining 8 per cent is recovered in such a manner that it has lost approximately half its value.

(7) By treating press liquors with a chemical coagulant, such as aluminum sulphate, and passing the liquors through a pressure filter the oil and water emulsion is broken, and all suspended solids and about one-third of the dissolved solids may be recovered. In addition, such treatment may be expected to give a greater oil recovery.

(8) Approximately 80 per cent of the suspended material may be recovered without difficulty by means of a 60-mesh mechanical screen.

(9) Screened press liquors may be handled successfully in a mechancial separator. A similar separator will also recover the oil from the present waste waters.

(10) Low acid oil may be obtained from fresh gurry by mechanical separators as well as by filter pressing with a filter aid.

(11) Estimated recovery costs based on the solids content of press liquors and data supplied by manufacturers of evaporators indicate that the possibility of recovering the solids in waste waters warrants the consideration of manufacturers of evaporators and menhaden operators.

(12) Storing oil in open tanks at the factory causes an increase in the free fatty acid content of the oil.

(13) The present flame drier used in the industry causes a loss of over 10 per cent of the monetary value of the scrap dried.

(14) Steam-tube driers will reduce the present loss in monetary value of dried scrap by over 50 per cent.

(15) Hot dried scrap may be cooled rapidly in an aerator and a portion of the residual heat used for further drying of the material.

(16) Preliminary feeding tests indicate that steam-dried menhaden meal has greater nutritional value than the flame-dried product.

(17) The quantity of fat extractable with ether decreases during storage. The rate of the decrease is more rapid in the flame-dried product.

(18) Menhaden stored at temperatures of from 35° to 40° F. are apparently in as good a condition for reduction purposes after 5 to 6 days as fish kept at ordinary summer temperatures for a period of 24 hours.

MANUFACTURING FISH OILS OF HIGHER VITAMIN POTENCY

The interest which has been aroused concerning the use of fish oils in animal feeding suggests that if these oils are suitable for such usage more should be known about the relation which method of manufacture bears to nutritional value. Data should be available to guide the fish oil producer in manufacturing an oil conserving as near as possible, its original vitamin potency. With this in mind, an investigation was undertaken to measure the effect of the various operations in the manufacturing process on the vitamin potency of the oil.

The data obtained as a result of the test work disclosed that the greatest destructive effect on vitamin D during the reduction process can be attributed to the present method of breaking the separated oil emulsion by treatment with heat in the oil cooking tanks. Fish oil manufacturers who desire to produce oil of higher vitamin potency therefore should take steps to eliminate the operation from the factory process. Information obtained during the test work suggested also several methods of manufacturing procedure whereby this could be accomplished.

The first method requires the use of (*a*) a mechanical screen to remove the majority of the suspended solids in the press liquors, (*b*) a centrifuge which gives a three-phase separation to make a preliminary separation of the oil portion in the presence of fine solids, and (*c*) a centrifugal oil purifier.

A second method would require the use of (*a*) a centrifugal extractor to remove the solids present in the press liquors, (*b*) a screening arrangement to recover the solids removed by the extractor, and (*c*) a centrifugal oil and water separator to make the final oil and water separation.

A third method would require (*a*) immediate filtration of chemically treated press liquors, (*b*) mechanical separation of the filtered liquor, and (*c*) mechanical purification of the separated oil.

A fourth method would require (*a*) the use of a screen to remove the bulk of the suspended material as the liquor flowed from the press floor, (*b*) the use of the present system of gravity separating tanks, and (*c*) a centrifugal separator to remove the oil from the separated emulsion.

A fifth method would permit the use of the present factory process up to the point where the oil and emulsion is floated to the cooking tanks. The separated oil layer then would be filter pressed to remove fine solids held in emulsion and the oil recovered in a centrifugal oil separator.

All of the above procedures are applicable to the present wet reduction process as the liquors flow from the press floor. In the case of menhaden oil, application of the above principles was found to yield an oil having a vitamin D potency 25 per cent higher than oil manufactured by the present process.

COOKING AND PRESSING FISH

Realizing the importance of the cooking and pressing operations in the manufacture of fish oil and fish meal from such fish as menhaden, sardine, and herring, and the waste resulting from salmon, tuna, and mackerel canning operations, bureau technologists, during the past year, undertook a study of certain aspects of the cooking and pressing of oily fish. The primary objects of the study were to obtain (1) data concerning the possibility of reducing pressing losses as a result of cooking methods, (2) data which could be used to guide press operation, and (3) data which could be used as a basis for press design. In order to determine this, tests were made on (*a*) the effect of the amount of cooking on extraction, (*b*) the effect of cooking fish by direct and indirect steam heat on oil extraction, solids lost in press liquors, color of oil and acidity of the oil, (*c*) the effect of the intensity of pressure on extraction and solids loss, (*d*) the effect of the rate of pressure increase on extraction and solids loss, (*e*) the effect of time on extraction, (*f*) the effect of aperture size on extraction and solids loss, (*g*) the effect of the thickness of press cake on extraction, and (*h*) the effect of preliminary drainage on extraction. Although the experimental work has been concluded the data have not been sufficiently analyzed to permit definite conclusions to be published at the present writing.

REDUCTION OF NONOILY FISH WASTE

Knowledge obtained in past researches by the bureau on the effect of methods of manufacture on the nutritive value of fishery by-products has given impetus to the bureau's study of efficient utilization of the waste incident to the North Atlantic ground fishery and the waste accumulated in the preparation of these fish for market as packaged products. During the past year a program has been worked out which will involve an exhaustive and detailed study of this subject. The investigative work outlined has been designed to determine the relation of: (1) Temperature, (2) method of applying heat, (3) kind of heating medium, (4) length of contact with the heating medium, and (5) particle size upon the quality of the products and the efficiency of the process. Both chemical and biochemical studies will be carried on in connection with the engineering studies, and products for both human and animal consumption will be investigated. The investigation will also include a continuation of the bureau's study of the utilization of trawler waste.

In past studies on this subject, efforts have been made to adapt equipment designed for other purposes to fit the requirements for fish meal and fish flour manufacture. Although the studies indicated certain improvements the final results were never completely satisfactory. It is believed, therefore, that in determining the relation of certain principles of reduction and the chemistry of the material to the quality of the final product manufactured, more intelligent progress will result. This work is contemplated for the Gloucester technological laboratory of the bureau.

THE IODINE NUMBER OF HADDOCK LIVER OIL

According to the Pharmacopœia of the United States, cod-liver oil is specified as being obtained from the fresh livers of the cod, *Gadus morrhua* Linnæus and of other species of Gadus. The latter statement was evidently meant to include fish of species related to the cods, such as haddock, cusk, hake, and pollock. Even though this conception of the definition is generally accepted the specifications on iodine value have raised a question of importance to the ground-fish industry. Some samples of haddock liver oil have shown an iodine value of over 180, which is the maximum prescribed by the Pharmacopœia.

Before the era of packaged fish the above fact did not offer a problem, since the availability of cod livers greatly exceeded that of haddock livers. Since that time, however, some of the largest concerns in the ground fishery have grown primarily on trade in packaged haddock fillets. Thus, within the space of a few years, the domestic supply of livers for liver oil manufacture has turned from cod to haddock.

In view of the fact that the present domestic demand for cod and cod-liver oil is about 5,000,000 gallons annually, while domestic production is less than 300,000 gallons, it is considered important that every effort be made to encourage the use of livers suitable for this purpose. However, before progress can be expected, manufacturers must be assured that the possibility of the high iodine number of haddock liver oil will not detract from the monetary value of the product. Accordingly, during the past year, the bureau made preliminary plans incident to an investigation of this problem which is now under way.

The scope of the investigation will include a study of the iodine number of haddock liver oil at different seasons of the year from fish caught on the various important fishing grounds. This work will then be correlated with a biochemical study of the oils, and if the results indicate that present specifications are detrimental to the future of haddock liver oils, recommendations will be made in an effort to obtain for the product just consideration.

IMPROVED HANDLING OF FRESH AND FROZEN FISH

During the year the bureau established a refrigeration laboratory at the Municipal Fish Market in this city for the purpose of continued studies in the evaporation of moisture from frozen fish, the rusting of frozen fish, and the losses incurred through leaching of fish packed in ice. The equipment consisted of a laboratory brine freezer, which employs dry ice as a cooling medium for the brine. The fish are frozen in aluminum pans and molds floated on the brine. The cooling is accomplished by placing the dry ice in pans arranged with "fins" on the bottom so as to obtain the maximum surface contact and increase the refrigeration efficiency. In actual practice it was found that 1 pound of dry ice would lower the temperature of 4 cubic feet of brine approximately 4° F. The heavily insulated cabinet around the brine tank renders it possible to hold temperatures as low as 60° below zero F. with a comparatively small quantity of dry ice.

In addition to this quick freezer, the laboratory was equipped with three electric refrigerators. These were supplied with an oversize unit capable of holding a temperature of 15° below zero F. A specially constructed thermostat was arranged so that it would hold the temperature constant within 0.2 of a degree F. These refrigerators were also equipped with a recording thermometer, which made a continuous record of the temperatures.

The fish to be studied were first frozen at temperatures of approximately 50° below zero F. These were then coated with hydrogenated cottonseed oil, untreated cottonseed oil, peanut oil, or corn oil; also one sample was water glazed as a control. They were stored at a constant temperature approximating the conditions of commercial storage as nearly as possible. The samples coated with cottonseed oil showed up particularly well, reducing the evaporations from about

23 per cent in the glazed fish control to 6 per cent in the treated fish. It is estimated that this treatment will cost the producer less than 1 cent per 40 pounds of fish, and will not detract in any way from the value. In fact, it enhances the value of the fish, as cottonseed oil is edible and is often used as frying fat.

During the time when this work was being conducted at the request of the authorities of the District government, the technologist offered suggestions which would tend to increase the attractiveness of the Municipal Fish Market. These dealt with the sanitary conditions, improvements in refrigeration facilities for the stores, and general recommendations.

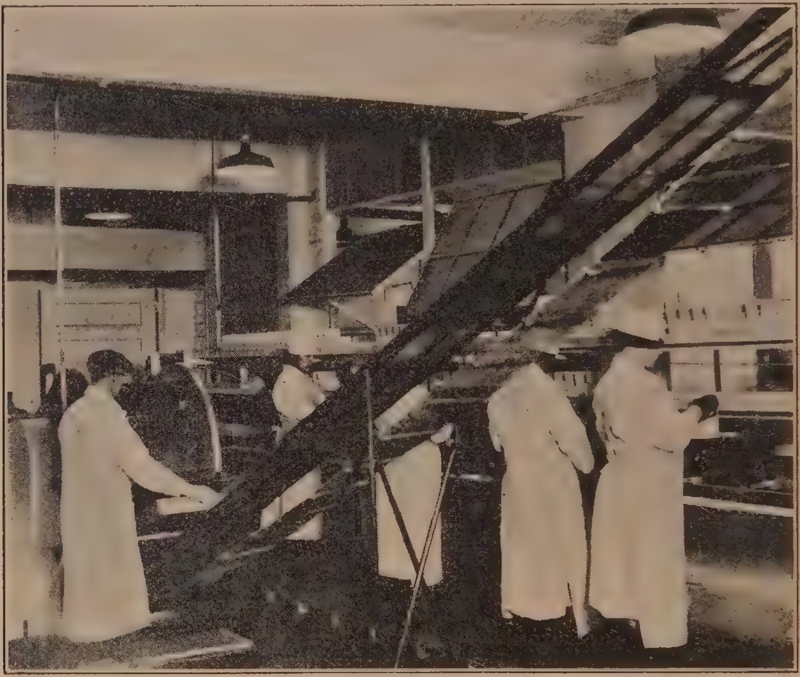

FIGURE 2.—Fish packaging

LEACHING OF FOOD AND MINERAL VALUES

It has been recognized for several years that there is appreciable loss of food value and mineral constituents when fish are packed in contact with crushed ice. The water from the melting ice drips over the fish and results in a leaching effect.

The losses incurred in weight of the fish in food and mineral value have never been determined, and very little has been done to prevent losses of this nature. In preliminary experiments it was found to be as high as 4 pounds per ton over a period of seven days. This apparently is not a great loss until it is multiplied by the amounts of fish handled in crushed ice over a period of a year; then it begins to assume proportions which are really surprising.

In this same consideration it should be emphasized that the flavor and mineral constituents of the fish are the most important constituents which are most readily lost by leaching, and if losses of this nature are reduced the taste and food value of the fish will be little impaired from that as originally caught.

The first series of these experiments has been completed, including a detailed report of the findings.

FREEZING OYSTERS

During the past year experiments have been conducted on freezing oysters. If rapidly frozen oysters could be introduced for consumption in the summer months and the public induced to buy them, the yearly output of the producers could be increased materially. The research has demonstrated that oysters can be rapidly frozen and placed in cold storage for several months without impairing the taste.

FIGURE 3.—Quick freezing fish fillets for packaged trade

NET PRESERVATION

Investigation of net preservatives has indicated four general lines for study, as follows: (1) Development of chemical preservatives, (2) application of chemicals to textiles, (3) variability of location of nets, (4) yearly variability of deterioration in one locality. Under the first subheading the work of 1930 indicates that colloidal silver, selected dyes, and certain antioxidants have valuable preservative properties. Thorough milling of solid constituents of a net dip appear to be highly beneficial. The utilization of tung oil or of special lacquers for net preservation seems advisable. Under the second heading ideal practice has been demonstrated as described in Bureau of Fisheries Economic Circular No. 74. The study of the variability of fishing waters in relation to net preservation has been greatly expanded in the past year, material being exposed in 21 fishing areas covering all sections of continental United States in addition to the accelerated exposure at Beaufort, N. C. No special attention has been given to the yearly variability as this has been previously recognized. It was noted, however, that due to local drought conditions the fouling of nets in Chesapeake Bay was exceptionally heavy in 1930. The deterioration of nets appears to be primarily influenced by currents, depth of water, character of bottom, concentration of bacteria, salinity, and temperature. The work of 1930 was divided between trap netting and gill netting since these are not only important classes of nets in themselves, but are typical of most of the other nets in the matter of preservation.

TRAP NETS

These represent the nets that must be exposed in water for long periods. They must be strong to withstand storms and rough handling, and hence are made of heavy cotton. It is desirable that the webbing should be flexible, resistant to abrasion and marine growths, and yet be as light as possible. During 1930 these ideal conditions were approached by several preservatives. The principle of impregnating the twine with a light chemical mixture and covering this with a heavy mixture appears to have been established as highly beneficial.

Copper oleate, when used in combination with other materials, continues to be very efficacious, especially in fresh water. Coal tar is still an essential component in the most desirable trap preservative formulæ. The fishermen suffer heavy losses due to inferior tars, and a high grade standard quality is greatly needed.

GILL NETS

Exposures of gill-net thread were made in representative waters in 1930 and at the Reedville (Va.) laboratory. Extensive work was carried on in which the small gill nets were operated to reproduce on a laboratory scale the service of commercial gill nets, except that the catch of fish was kept at a minimum. By this means information was gained concerning comparative deterioration of cotton, silk, and linen, the effects of preservation on webbing, and certain effects of chemical washing. The most important fact demonstrated was that the deterioration of a gill net by the direct rays of the sun is much more destructive than water exposure for the same length of time. A certain chemical was proven to be highly efficacious in resisting the destruction caused by the rays of the sun.

Much data on these classes of twine were obtained through the assistance of fishermen and other cooperators, who exposed small mailable samples, which were afterwards returned to Washington for inspection. This principle of obtaining information regarding special fishing waters may be of considerable future value.

NUTRITIVE VALUE OF MARINE PRODUCTS

Marine products represent an important source of food. This class of foods, generally speaking, is a good source of proteins, vitamins, and minerals in quantity and variety. Because of these facts and because the primary consideration of food products is their food value, the Bureau of Fisheries has become greatly interested in the science of nutrition.

As stated in the 1929 report of this division, this bureau arranged with the Bureau of Chemistry and Soils a cooperative research program to study the nutritive value of marine products and assigned a chemist for this purpose to the laboratories of the protein and nutrition division of the Bureau of Chemistry and Soils, United States Department of Agriculture. As previously reported, the first studies dealt with the vitamins A and D content of such commercial fish oils produced in the United States and Alaska as tuna, salmon, pilchard (California sardine), Alaska herring, Maine herring, and menhaden. Some of these oils were found to be good sources of vitamin D for animal feeding. It was thought that heat and oxidation in the process of manufacture now in commercial use might adversely affect the vitamin content of these oils. Accordingly, studies of the effect of different processes of manufacture of experimentally prepared oils were inaugurated. Some of these have been completed. A study of the above character made in connection with menhaden fish oils revealed that, whereas commercial menhaden oil contained only about three-fourths the vitamin D content of medicinal cod-liver oil, menhaden oils prepared according to some of the experimental processes described in the by-products section of this report were equally as potent in vitamin D as medicinal cod-liver oil.

Salmon oils extracted from the canned offal of the five commercial species of salmon were tested. Four out of the five tested species proved to be equal to medicinal cod-liver oil in content of vitamin A. All of these oils were equal to medicinal cod-liver oil in vitamin D, and three of the species were twice as potent in vitamin D as medicinal cod-liver oil. Oils extracted from the edible canned product of the five species of salmon proved to be equal in vitamin D content to medicinal cod-liver oil; however, the vitamin A content was relatively low. This may be due to the canning process or present cannery methods. Other experiments being conducted by our biochemists in the laboratories of the Bureau of Chemistry and Soils are (*a*) the vitamins A and D content of burbot liver oil, (*b*) the chemical and physical characteristics of burbot liver oil, (*c*) the vitamin D content of oysters from different localities of the United States.

In view of the fact that American fish oils are comparatively rich in vitamins A and D, these may replace imported cod-liver oil in this country and lessen our dependence on foreign sources of supply. Experiments indicating the relatively high vitamin content of canned salmon should be of considerable interest to our great salmon-canning industry.

The bureau's investigator at Johns Hopkins University has completed certain experimental work in connection with the mineral content of fish meals and kelp meal. Spectographic analyses of the mineral elements occurring in these products were made. In some instances some of the less common elements were identified in quantities too small to be detected by ordinary chemical analyses. As far as possible, however, chemical analyses were conducted to verify the spectographic determinations. The following mineral constituents were found, either by chemical or spectographic analyses: Aluminum, barium, boron, calcium, chromium, copper, fluorine, iron, iodine, lead, lithium, magnesium, manganese, nickel, niobium, phosphorus, potassium, sulphur, silicon, silver, sodium, strontium, thallium, tin, titanium, vanadium, and zinc.

Some months ago, one of the bureau's biochemists was assigned to a cooperative research project in the laboratories of the South Carolina Food Research Commission at Charleston, S. C., in which a study is being made of the mineral content of oysters with a relation to the prevention and cure of nutritional anemia. Copper, manganese, and iron are the mineral elements inviting special attention in this connection. Samples of oysters are being procured from localities representing as far as possible the entire United States at different seasons of the year. This project will require at least a year for completion.

Recently considerable interest has been shown in fish flour—a product at the present time being prepared experimentally from the edible parts, including the backbone, of fish remaining from the filleting or packaged fish industry. This product is dried at a low temperature, under vacuum, and ground into a fine meal or flour. It has a pleasant taste and odor, as well as an attractive appearance. It can be made cheaply, as it comes from raw material which is now either a waste or is converted into fish meal for animal feeding. It may contain as high as 28 to 30 per cent of minerals, consisting largely of calcium and phosphorus. Laboratory investigations and baking tests, conducted by the Cereal Laboratory of the Bureau of Chemistry and Soils in cooperation with this bureau, have demonstrated that it is possible to incorporate 10 to 25 per cent of this fish flour in bakery products, of a palatable and nutritious nature, designed especially to appeal to children. Fish flour should be of considerable value in bone growth. Arrangements have been made with a public institution to make a special study of fish flour in the diet of children. Cooperation of the District of Columbia medical and dental

FIGURE 4.—Portion of fisheries nutrition laboratory

societies has been extended to the bureau in connection with these tests.

The bureau is continuing its cooperative tests, in extending its nutrition studies to farm animals, with various Federal and State agricultural experiment stations. At the present time, these studies are being confined to various fish and shellfish meals, but it is hoped to extend them to other marine products suitable for use in animal nutrition such as fish oils and kelp meal. Notable among these cooperative stations may be mentioned the United States Department of Agriculture, Bureau of Animal Industry, Experimental Farm at Beltsville, Md.; the Ohio Agricultural Experiment Station, Wooster, Ohio; and Cornell University Agricultural Experiment Station, Ithaca, N. Y.

The number of nutrition studies relating to and depending on other phases of the bureau's technological investigations, together with demands for nutrition investigations from the industry, have compelled the bureau to establish its own nutrition laboratory. The investigations already planned will tax the facilities of the new nutrition laboratory to the utmost for at least a year or more. The experimental animal most universally used, namely, the albino rat, is used in our nutrition studies.

In cooperation with this bureau, the division of animal husbandry, Bureau of Animal Industry, United States Department of Agriculture, has completed recently at the experiment farm located at Beltsville, Md., feeding tests with sheep in which the nutritive value of shrimp meal has been studied over a period of approximately two years. The sheep were divided into two lots. Lot 1 received a ration of 8 parts oats, 8 parts bran, 4 parts corn, and 2 parts of old process linseed oil meal by weight. Lot 2 received the same ration except that the linseed oil meal was replaced with an equal quantity of shrimp meal. Both lots were fed equal amounts of western alfalfa hay and equal amounts of corn ensilage. The total gain in pounds of the sheep on the linseed oil meal ration was 556 in 1929, whereas sheep on the shrimp meal ration gained a total of 582 pounds in 1929. In 1930, each lot gained 475 pounds. These two rations were of approximately equal value in wool production. The data obtained from these tests indicates that shrimp meal is just as valuable as old process linseed oil meal for feeding sheep when used up to 10 per cent of the total grain mixture.

GLOUCESTER LABORATORY

The bureau is establishing a large field laboratory at Gloucester, Mass., for the general conduct of technological research, including the following activities: Refrigeration, smoking, canning, bacteriology of industrial processes, by-products, and production methods.

MARKET AND INDUSTRIAL SURVEYS

Market and industrial surveys are made to supply the trade with useful market information regarding the distribution and consumption of fishery products and to supply descriptive and economic data on our fisheries and fishery industries.

FISH-FARMING INDUSTRIES OF THE UNITED STATES

Continuing the work started in 1928 in a survey of the goldfish industry, the fish-farming industry was further studied during 1930 when a market survey was made of the trout and pond-fish industries. The fish farmed in the trout industry are brook trout, brown trout, rainbow trout, cut-throat trout, lake trout, and landlocked salmon. In the pond-fish industry, largemouth and smallmouth black bass, crappie, blue-gill sunfish, and catfish are farmed.

As a result of the survey it was found that the commercial raising of trout extends throughout the United States, although it is chiefly centered in the northern regions and those of high altitude, with the most important centers of the industry being located in Colorado, and in the North Atlantic States. The pond-fish industry, with but few exceptions, is confined to the more southern parts of the United States, where warmer waters, which are necessary for the growth of pond-fish are found.

In 1929 there were 133 trout and 11 pond-fish establishments raising fish commercially in the United States. These employed 262 persons, who were paid $277,538 in salaries and wages. Those raising trout used 5,969 acres of water, and those raising pond fishes used 638 acres. The products marketed in the trout industry were valued at $1,072,700, and consisted of eggs, fry, fingerlings, yearlings, and adults. The products of the pond-fish industry were valued at $21,444, and consisted of fingerlings, yearlings, and adults. The value of these products combined with $942,000, the value of the products marketed annually by the goldfish industry, makes the annual production of all fish-farming industries in the United States worth $2,036,144.

Trout and pond-fish products are distributed mainly during the summer months, and almost wholly by the individual producers. The greater proportion of the production is sold directly to consumers at the hatchery, or shipped to them on orders received at the hatchery. Eggs, fry, and fingerlings are purchased for stocking mainly by sportsmen's organizations, and State and Federal Governments, although some are purchased by individuals for stocking private streams or lakes. Yearlings and adults are also bought by the above types of purchasers for stocking purposes, although the greater proportion is purchased by hotels, restaurants, dining cars, other commercial eating houses, and individuals for eating purposes.

The full report on this survey is contained in Fishery Circular No. 2 entitled, "Fish-Farming Industries of the United States." This may be purchased for 5¢ from the Superintendent of Documents, Government Printing Office, Washington, D. C.

FISH OILS

During the year 1930 the price of all fats and oils decreased markedly—marine-animal oils being affected more adversely than any others. In addition to the drop in price the demand for domestic oils of marine origin decreased to the point where very little oil could be sold at even the extremely low prices which prevailed. In order to determine the reason for these conditions the bureau conducted a study of the markets for marine-animal oils in the United States. In making the study, the bureau's representative (1) interviewed members of the more important consuming industries (manufacturers of soap, paint, linoleum, oil cloth, and feed), in order to determine the attitude of the trade toward the oils, (2) interviewed concerns interested in the sale and distribution of the oils, and (3) reviewed all available statistics concerning the production, importation, and consumption of the oils during the past decade.

The results of the survey show that both the consuming public and the consuming industries hold a general apathy toward the use of marine-animal oils, especially the fish oils. The consumption of these oils is based upon their serving as cheap substitutes for other fats and oil. This condition has resulted from the manufacture of inferior products in the past, lack of uniformity in the quality of the present domestic product, and improper marketing methods. In addition, the competition received from foreign marine-animal oils and the apparent preference of the consumer for some of these in place of domestic oils has tended to decrease the utility of the domestic oils by the development of a most unhealthy condition in the domestic supply.

The study indicates that if the domestic marine-animal oil industry is to prosper in the future it must break down the apathy toward the use of these oils, and increase their usefulness to the consumer by improving their quality, by finding new outlets, and by reducing the present effect of competitive products.

VIRGIN ISLANDS OF THE UNITED STATES

After the President's return to Washington from his visit to the Virgin Islands of the United States, the economic plight of these islands was brought forcibly to the attention of the various governmental departments and establishments, and, wherever possible, each was requested to give consideration to methods for alleviating this condition.

As no recent data were available in its field, the Bureau of Fisheries made arrangements for a brief economic survey of the fisheries with the intention of securing detailed data on the methods and practices followed, and to suggest possible changes for their improvement.

On May 2, 1931, the writer and one of the division's technologists were detailed to conduct this survey and on May 15, 1931, began work in St. Thomas, Virgin Islands. In the course of the work, about 85 per cent of the fishermen were interviewed in all the principal fishing localities as well as many people interested in the fisheries. The preliminary survey was completed on May 30, 1931.

As a result of the survey it was found that the industry in the islands is faced with the problem of marketing the catch now obtained rather than that of securing a sufficient supply, for there is reason to believe that there are many times throughout the year when the local markets are glutted with fish, making it impossible to dispose of the catch. Two plans appeared feasible for expanding the market. These are: (1) Expanding the market for fresh fish; (2) Establishment of a local fish-curing industry to replace imported cured fish. In order to further these plans, the division's technologist remained to conduct experiments along these lines. If successful, the economic welfare of the fisheries of the islands will be materially benefited.

PUBLICATIONS OF THE DIVISION

During the calendar year 1930 the following publications were prepared and issued by this division. The list does not include the monthly statistical bulletins of the landings of fish at Boston and Gloucester, Mass., Portland, Me., and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish. The documents may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices shown. The statistical bulletins are distributed free of charge upon request. Persons interested in securing the statistical bulletins as released may have their names placed on the bureau's mailing list upon request.

DOCUMENTS

Net preservative treatments. By W. T. Conn. 8°, 6 pp. Document No. 1075. 5 cents.

Utilization of shrimp waste. By F. C. Vilbrandt and R. F. Abernethy. 8°, 22 pp., 3 figs. Document No. 1078. 10 cents.

Investigations upon the deterioration of nets in Lake Erie. By A. C. Robertson and W. H. Wright. 8°, 28 pp., 10 figs. Document No. 1083. 5 cents.

Review of the fisheries of California. By R. H. Fiedler. 8°, 29 pp., 8 figs. Document No. 1087. 10 cents.

Fish meal in animal feeding with bibliography. By John Ruel Manning. 8°, 37 pp. Document No. 1090. 10 cents.

Fishery industries of the United States, 1929. By R. H. Fiedler. 8°, 364 pp, 29 figs. Document No. 1095. 55 cents.

SPECIAL ARTICLES

This trend toward frozen fish. By R. H. Fiedler. Fishing Gazette, annual review number, June 15, 1930, vol. 47, No. 7, pp. 53–62.

Solving the question of crab migrations. By R. H. Fiedler. Fishing Gazette, June 1, 1930, vol. 47, No. 6, pp. 18–21.

Activities of fishing industry coordinated by Federal agency. By R. H. Fiedler. United States Daily, December 1, 1930.

Economic and market surveys conducted on fishing industry. By R. H. Fiedler. United States Daily, December 2, 1930.

Valuable information gathered for fishing industry of nation. By R. H. Fiedler. United States Daily, December 3, 1930.

Vitamins A and D in fish oils. By E. M. Nelson and John Ruel Manning. Industrial and Engineering Chemistry, vol. 22, December, 1930, p. 1361. (Cooperative contribution of the Bureau of Chemistry and Soils and the Bureau of Fisheries.)

The use of marine products in animal nutrition. By John Ruel Manning. Record of Proceedings of American Society of Animal Production, 1930.

STATISTICAL BULLETINS

Landings by fishing vessels at principal New England ports, 1929; by months. Statistical Bulletin No. 860.

Landings by fishing vessels at principal New England ports, 1929. By gear and banks. Statistical Bulletin No. 861.

Fishery products landed at Seattle, Wash., by American fishing vessels, 1929. Statistical Bulletin No. 862.

Lake Fisheries. 1928. Statistical Bulletin No. 864.

Fishery products frozen and cold-storage holdings of frozen fish and cured fishery products in the United States and Alaska, 1929. Statistical Bulletin No. 868.

Fisheries of the Pacific Coast States, 1928. Statistical Bulletin No. 872.

Fisheries of Alaska, 1929. Statistical Bulletin No. 873.

Canned fishery products and by-products of the United States and Alaska, 1929. Statistical Bulletin No. 874.

Production of fresh, frozen, and smoked package fish in the United States, 1929. Statistical Bulletin No. 875.

Fisheries of the Gulf States, 1928. Statistical Bulletin No. 877.

Fisheries of the South Atlantic States, 1928. Statistical Bulletin No. 880.

Fisheries of the United States and Alaska. Statistical Bulletin No. 881.

Fisheries of the New England States, 1928. Statistical Bulletin No. 882.

Part 2. FISHERY STATISTICS

REVIEW

As the scope of fishery statistics has widened with frequent surveys being made, more definite analyses, and trends have been made possible.

GENERAL

The catch of fishery products in the United States and Alaska during 1929 exceeded that during the previous year. The value of the output of canned fishery products and by-products in 1930 decreased as did the production of packaged fish. The production of frozen fish increased over 1929, and both imports and exports of fishery products decreased as compared with 1929.

In 1929, the domestic fisheries employed more than 191,000 persons, of whom about 123,000 were fishermen, 4,000 were employed on transporting craft, and 64,000 were engaged in wholesale and manufacturing industries. The catch amounted to about 3,567,000,000 pounds, valued at $123,054,000.

In 1930, the production of canned fishery products amounted to 576,685,000 pounds, valued at $82,858,000, and the output of by-products was valued at $23,721,000. Cold-storage holdings of fish averaged about 62,400,000 pounds monthly, while 139,297,000 pounds were frozen. The production of fresh, frozen, and smoked packaged fishery products amounted to 80,014,000 pounds, valued at $12,580,000. Fishery products imported for consumption were valued at $50,830,000, while domestic exports were valued at $17,276,000. The production of cured fish in 1929 amounted to more than 119,000,000 pounds, valued at $18,000,000.

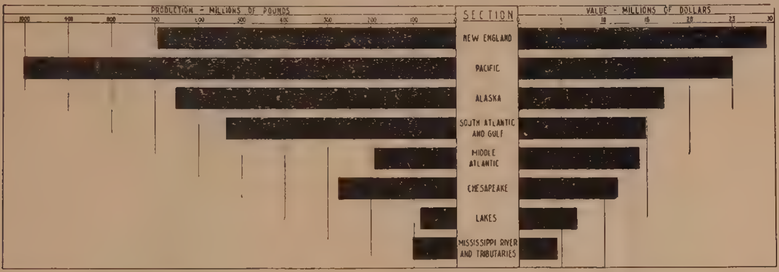

FIGURE 5.—Production and value of the fisheries of the various sections of the United States and Alaska, 1929

YIELD OF FOOD FISHERY PRODUCTS, BY VOLUME

The yield of food fishery products in the United States and Alaska amounted to 3,098,000,000 pounds in 1929. About 155 products contributed to this poundage. When considered by individual products, it was found that 80 per cent of the entire yield consisted of 11 groups of products. First in importance among these were pilchard, which is utilized in California for canning as sardines. Of second importance was salmon, which is the basis for a valuable canning industry on our Pacific coast from California north to the Bering Sea. Sea herring was third in importance. These fish are used extensively in Maine for canning as sardines, in Alaska and New

England for salting and smoking and large quantities are also frozen for use as bait. Haddock which is taken on the banks off the North Atlantic seaboard, ranked fourth. This fish is the basis for the fresh and frozen packaged fish trade. Oysters ranked fifth in importance. These were taken commercially in nearly every sea-coast State. Those taken in the more northern latitudes generally are marketed fresh, while those taken in the Southern States are used principally for canning. Mackerel was sixth in importance and was taken along the North Atlantic coast and off the cost of California. Cod ranked seventh and was taken mainly in the vessel fisheries prosecuted from the New England ports. Cod is used largely for salting. Shrimp, which was eighth in importance, is used chiefly in the canning industry in the Southern States. Crabs were ninth in importance and were taken chiefly in the Chesapeake Bay region, where they constituted one of the most important fisheries. Tuna and tunalike fishes, which are taken off the coasts of California and Latin America, were tenth in importance and form the basis for an important conning industry in California. Flounders, which ranked eleventh in importance, were taken in the marine fisheries of all sections.

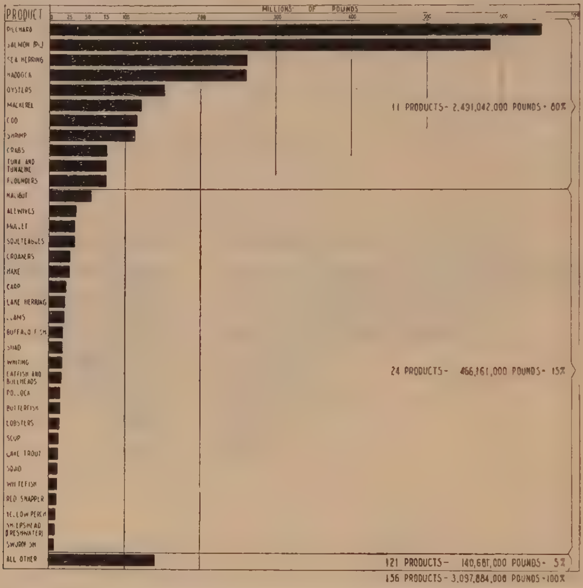

FIGURE 6.—Yield of edible fishery products taken in the United States and Alaska, 1929

Among the species of moderate commercial importance were 24 products whose yield contributed 15 per cent to the catch in 1929. Included in this group are some whose catch in previous years greatly exceeded the present yield—shad and lobsters being outstanding examples.

The species of least importance consisted of approximately 120 products whose yield accounted for only 5 per cent of the total catch. This group includes certain species which were at one time of considerable importance, but usually they consititute products of limited supply or inferior quality.

YIELD OF FOOD FISHERY PRODUCTS, BY VALUE

When considered according to value, 18 products accounted for 80 per cent of the catch in 1929. Listed in order of their importance they were: Salmon, oysters, haddock, halibut, shrimp, tuna and tunalike fishes, clams, lobsters, pilchard, cod, flounders, mackerel, shad, crabs, sea herring, squeteagues, lake trout, and whitefish.

It will be noted that the rank of species when considered according to value differs considerably from that shown with respect to volume. While pilchard ranked first in volume, its place in value was ninth, and salmon, which was second in volume, ranked first in value. Considerable variation of this type is noticeable due to the difference in unit values.

In the group of moderate importance, 26 products accounted for 15 per cent of the total value and in the group of least importance, about 110 products accounted for the remaining 5 per cent of the value.

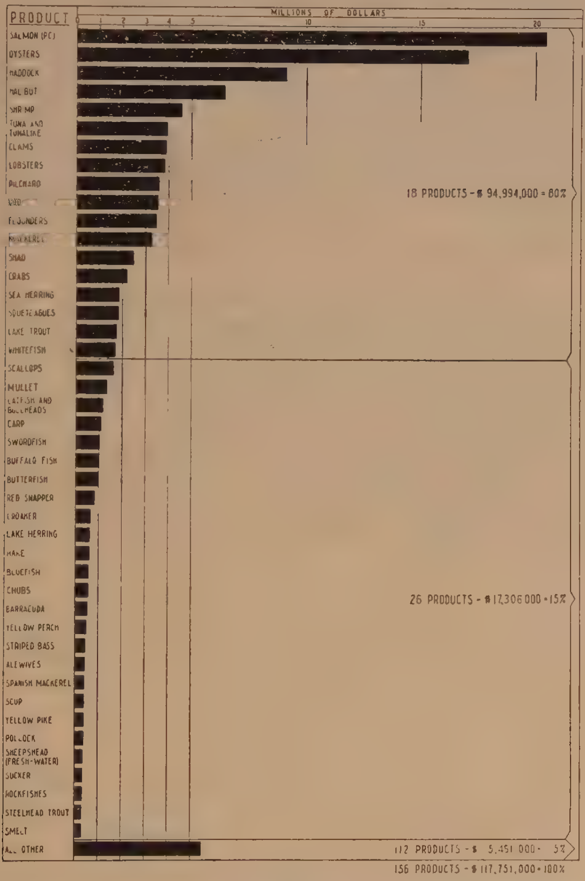

FIGURE 7.—Value of edible fishery products taken in the United States and Alaska, 1929

Yield of Nonfood Fishery Products

The yield of nonfood fishery products in the United States and Alaska in 1929 amounted to 469,000,000 pounds, valued at $5,303,000. The most important products in this group were menhaden and fresh-water mussel shells. The menhaden is manufactured into scrap and meal for use as fertilizer or in animal feeding and into oil which is used extensively in the making of soap and paint. Fresh-water mussel shells are utilized chiefly in the manufacture of pearl buttons and novelties. Other important products in the nonfood group were whale products, king crabs, and sponges.

Yield of the Marine Fisheries of the United States, By Gear

With respect to the weight of the catch in the marine fisheries of the United States, 7 types of gear accounted for 88 per cent of the total. In order of their importance they were: Purse seines, which accounted for 28 per cent of the catch; lampara nets, 18 per cent; otter trawls, 15 per cent; lines, 13 per cent; pound nets, 6 per cent; and dredges and gill nets, each, 4 per cent.

Considered according to the value of the catch, 10 types of gear accounted for 91 per cent of the total. In order of their importance they were: Lines, which accounted for 17 per cent of the value; otter trawls, 16 per cent; dredges, 15 per cent; purse seines and pound nets, each, 9 per cent; gill nets and tongs, each, 7 per cent; pots and lampara nets, each, 4 per cent; and haul seines 3, per cent.

Yield of the Fisheries of the United States, 1880 to 1929

Only one complete survey for statistics of the commercial catch of fishery products in the United States has been made during the 50 years from 1880 to 1929, that being in 1908. However, during this period from 5 to 24 annual surveys have been made in the individual geographical sections. It is apparent, therefore, that data are not available to compute an actual trend of the fisheries during the past half century. It is possible, however, to compute average annual yields from the figures obtained in those surveys which have been made by prorating the yields for the intervening years. The table presented on page 143 is the result of such computations.

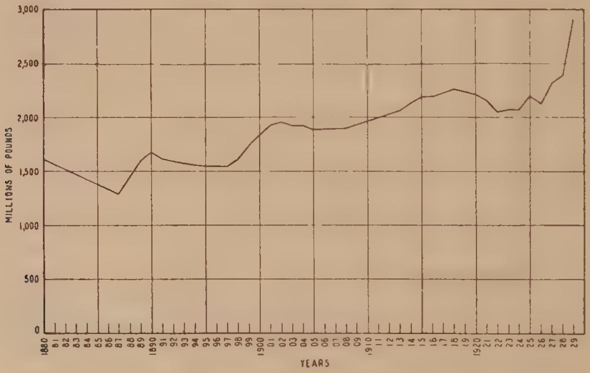

FIGURE 8.—Yield of the fisheries of the United States, 1880 to 1929

From this tabulation it will be noted that the yield of the commercial fisheries of the United States (excluding Alaska) has increased from 1,614,789,000 pounds in 1880 to 2,915,854,000 pounds in 1929, an increase of about 80 per cent. In general the increase has been consistently upward, showing the largest catch in 1929.

Considered according to geographical sections the fisheries of the New England States have shown comparatively little fluctuation, although in the past few years there has been an upward trend. In the Middle Atlantic States the trend has been downward, the catch 1880 never having been equalled in subsequent years. The catch in the Chesapeake Bay States in 1929 closely approximates that of 1880, however, during the intervening years, the yield has usually exceeded that of either the early or late years of the period. The peak was reached in 1920. The catches in both the South Atlantic and Gulf States have increased consistently from 1880 to 1929, the catches in 1880 being the smallest and those in 1929 by far the largest. In the Pacific Coast States the catch in 1929 exceeds by far that of any year during the period under review. There were numerous fluctuations in the trend until the past few years when there have been consistent increases. The yield of the fisheries of the Mississippi River and tributaries reached its peak in 1908. Since then the trend has been downward, but it yet is more than double that of 1880. In the lake fisheries the yield increased rather consistently from 1880 to 1890, when the largest catch was made. The period since 1890 has been marked by many fluctuations in the catch, finally reaching the lowest level on record in 1928. A partial recovery was experienced in 1929.

NEW ENGLAND STATES

The most recent general statistics of these States, which are for 1929, show that both the catch and value of the catch exceeded that in any year for which there are records. The catch increased 15 per cent in quantity and 13 per cent in value as compared with the catch in the previous year. Larger catches of haddock and mackerel were mainly responsible for this increase. Landings of fish at Boston, Gloucester, and Portland were the largest on record, although the value of these fish was somewhat less than in the previous year.

The output of packaged fish registered a decline of 7 per cent as compared with that in the previous year. The frozen fish trade shows a considerable increase in 1930 over 1929. The production of sardines, which is the principal fish-canning industry in this section and is centered in Maine, showed a decrease as compared with the previous year. The cured-fish industry increased in volume over that in 1928.

MIDDLE ATLANTIC STATES

The value of the catch of the fisheries of the Middle Atlantic States in 1929 exceeded that in any year for which there are records. This increased value is due largely to increased activities in the oyster industry. The weight of the catch was also greater than in 1926, when the most recent previous general survey was made.

Landings of fish at New York City and Groton, Conn., which consisted largely of haddock, flounders, cod, mackerel, and tilefish, decreased perceptibly as compared with 1929. The packaged-fish trade also decreased, as did the trade in frozen fish. The production of menhaden decreased as compared with that in 1929. The catch of shad in the Hudson River increased somewhat over the previous year. The production of cured fish showed a marked increase over 1926, the most recent previous year for which this industry was surveyed.

CHESAPEAKE BAY STATES

The most recent general statistical canvass of this section, which was for 1929, shows the smallest catch of fishery products since the survey for 1888. The decline in the volume of the menhaden catch has been largely responsible for this decrease in the total catch. The catch of shad in the Potomac River during 1930 was much less than that of 1929, but the catch of alewives increased slightly. The production of packaged fish was about the same as in 1929. The production of cured fish in 1929 was less than in 1925, when the previous survey for complete statistics of these products was made. The value of the production of menhaden products in 1930 was approximately the same as that in 1929.

SOUTH ATLANTIC AND GULF STATES

Statistics of the fisheries of these States for 1929 show the largest catch on record, although the value of the catch was exceeded in both 1927 and 1928. The production of cured fishery products in 1929 almost equalled the output in the previous year.

There were decreases in the production of canned oysters and shrimp as well as menhaden products. The manufacture of each of these products is an important industry in this section.

PACIFIC COAST STATES

In the years for which records are available the catch of fishery products in this section has increased constantly. In 1929 there was an increase of 47 per cent in the catch and 22 per cent in the value of the catch as compared with the previous year. The production of frozen fish was greater in 1930 than in 1929. The pack of cured fish decreased in 1929 as compared with the previous year. There was a decrease of 35 per cent in the pack of salmon in 1930 as compared with 1929, due to the smaller pack of humpback or pink salmon, as 1930 was the "off year" for these species. Compared with the pack in 1928, the previous "off year," there was an increase of 25 per cent in the pack. There was a decrease in the pack of sardines in 1930, but a large increase in the output of canned tuna and tunalike fishes. The landings of the halibut fleet in 1930 decreased somewhat from those in 1929.

LAKE FISHERIES

The United States fisheries prosecuted in the Great Lakes and the International Lakes of northern Minnesota show an increase in 1929 over the previous year. This increase may be attributed in part to the inclusion of certain products not canvassed in recent surveys and to a change in the methods of collecting statistics in some of the States. The catch of cisco, which was once an important product in the fisheries of Lake Erie, has continued to decrease at an alarming rate. The catches of lake herring, lake trout, and yellow perch, as well as some of the less important species, have shown recoveries from the small catches of 1928.

MISSISSIPPI RIVER AND TRIBUTARIES

No general survey of the fisheries of this region has been made since 1922, and therefore no recent trend can be determined. The yield of fresh-water mussels, which contributed approximately one-half to the total weight of the catch in 1922, shows an increase in 1930 not only over the production of 1922, but also that of 1929. The fisheries of Lakes Pepin and Keokuk decreased in yield in 1930 as compared with the previous year, but the catch in the Mississippi River between these two lakes shows a gain.

ALASKA

The catch of the fisheries of Alaska in 1930 was somewhat less than in the previous year. There was a decrease in the pack of salmon amounting to 6 per cent, as compared with the pack in 1929. The catch of herring as well as that of halibut was somewhat less than in the previous year. There was an increase in the frozen fish and cured fish activities over 1929.

Fisheries of the United States and Alaska, 1929 [1]

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Products	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Fish	646, 541	20, 881	120, 025	3, 733	169, 065	4, 633	375, 963	7, 402
Shellfish, etc	47, 745	8, 191	70, 748	10, 405	105, 609	6, 948	159, 432	7, 502
Total	694, 286	29, 072	190, 773	14, 138	274, 674	11, 581	535, 395	14, 904

Products	Pacific		Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Fish	1, 012, 729	23, 097	77, 922	6, 434	53, 466	3, 310	640, 490	16, 465	3, 096, 201	85, 955
Shellfish, etc	16, 167	1, 572	7, 467	354	47, 437	1, 139	2, 008	117	456, 613	36, 228
Whale products	5, 538	369					8, 925	502	14, 463	871
Total	1, 034, 434	25, 038	85, 389	6, 788	100, 903	4, 449	651, 423	17, 084	3, 567, 277	123, 054

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[1] All figures are for 1929, except those for the Mississippi River and tributaries. In this section the figures on the catch of mussels are for 1929 and other figures are for 1922.

Fisheries of the United States and Alaska, 1929—Continued

OPERATING UNITS: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Items	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf [1]
Fishermen:	*Number*	*Number*	*Number*	*Number*
On vessels	6,199	4,787	2,586	3,298
On boats and shore	10.961	5,704	15,884	23,345
Total	17,160	10,491	18,470	26,643
Vessels:				
Steam	55	19	30	
Net tonnage	8,805	2,556	3,118	
Motor	671	479	95	524
Net tonnage	17,589	6,973	1,120	8,961
Sail	5	85	281	90
Net tonnage	36	2,170	3,101	1,388
Total vessels	731	583	406	614
Total net tonnage	26,430	11,699	7.339	10,349
Boats:				
Motor	5,093	1,800	7,915	6,837
Other	6,524	2,596	5,500	10,704
Apparatus:				
Haul seines	220	375	394	1,290
Purse seines	179	39	47	71
Otter trawls (including all types and sizes)	656	224	5	2,396
Gill nets	14,645	2,447	18,891	18,041
Trammel nets				512
Pound nets, trap nets, and weirs	614	647	2,970	2,785
Stop nets		85	5	1
Fyke nets	378	4,773	3,307	3,818
Bag nets and pocket nets	181	31		
Other nets [4]	201	318	1,590	2,802
Hooks, baits, or snoods	4,688,392	670,151	1,288,960	357,494
Fish wheels				20
Eel pots and traps	5,490	7,859	13,102	1,523
Lobster pots	345,824	47,673		
Crab and crawfish pots, traps, drags, etc	3,943	74		6,708
Clam dredges	94	53		1
Crab dredges		2	124	453
Mussel dredges	1			
Oyster dredges	273	677	916	662
Scallop dredges and drags	3,399	1,102	819	703
Crab scrapes			1,695	
Tongs, rakes, hoes, forks, etc	3,638	3,201	9,772	4,872
Sponge apparatus				329
Other apparatus [6]	562	208	9	1,236

Items	Pacific	Lakes	Mississippi River and tributaries	Alaska	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5,822	1,769		[3] 10,921	35,382
On boats and shore	14,170	5,390	12,310		87,764
Total	19,992	7,159	12,310	10,921	123,146
Vessels:					
Steam	7	122		8	241
Net tonnage	283	2,712		617	18,091
Motor	783	378		726	3,656
Net tonnage	17,687	3,988		11,992	68,310
Sail	9				470
Net tonnage	3,392				10,087
Total vessels	799	500		734	4,367
Total net tonnage	21,362	6,700		12,609	96,488
Boats:					
Motor	6,033	2,078	4,597	1,861	36,214
Other	1,626	1,401	10,941	3,559	42,851

See footnotes at end of table.

Fisheries of the United States and Alaska, 1929—Continued

OPERATING UNITS: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Items	Pacific	Lakes	Mississippi River and tributaries	Alaska	Total
Apparatus:	*Number*	*Number*	*Number*	*Number*	*Number*
Haul seines	235	290	708	176	3, 688
Purse seines	394	---------	---------	703	1, 433
Lampara nets	256	---------	---------	---------	256
Otter trawls (including all types and sizes)	---------	---------	---------	---------	3, 281
Beam trawls	55	---------	---------	9	64
Paranzella nets	19	---------	---------	---------	19
Gill nets	455	108, 557	866	4, 225	168, 127
Trammel nets	554	100	459	---------	1, 625
Pound nets, trap nets, and weirs	724	8, 587	11	734	17, 072
Stop nets	---------	---------	---------	---------	91
Fyke nets	1, 920	2, 411	49, 652	---------	66, 259
Bag nets and pocket nets	76	---------	---------	---------	288
Other nets [4]	409	35	---------	---------	5, 355
Hooks, baits, or snoods	1, 254, 299	592, 080	(5)	(5)	(5)
Fish wheels	34	---------	---------	246	300
Eel pots and traps	---------	---------	---------	---------	27, 974
Lobster pots	---------	---------	---------	---------	393, 497
Shrimp nets and traps	---------	---------	4, 360	---------	4, 360
Crab and crawfish pots, traps, drags, etc	17, 010	4, 666	---------	740	33, 141
Clam dredges	---------	---------	---------	---------	148
Crab dredges	---------	---------	---------	---------	579
Mussel dredges	---------	---------	---------	---------	1
Oyster dredges	---------	---------	---------	---------	2, 528
Scallop dredges and drags	---------	---------	---------	---------	6, 023
Crab scrapes	---------	---------	---------	---------	1, 695
Tongs, rakes, hoes, forks, etc	3, 268	770	1, 810	---------	27, 331
Crowfoot bars (pairs)	---------	689	3, 490	---------	4, 179
Abalone outfits	22	---------	---------	---------	22
Sponge apparatus	---------	---------	---------	---------	329
Other apparatus [6]	66	6	(5)	---------	(5)

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[2] Includes the operating units used in the fisheries of Lake Okeechobee, Fla.

[3] Includes persons in boats and shore fisheries.

[4] Includes dip nets, cast nets, scap nets, reef nets, and other minor nets.

[5] Number not determined.

[6] Includes box traps, harpoons, spears, periwinkle and cockle pots, and other minor apparatus not included in "Other nets."

NOTE.—Whaling apparatus, the number of which was not determined, was used in the Pacific Coast States and Alaska.

CATCH: BY SECTIONS [2]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf [3]	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH								
Alewives	4, 393	40	1, 228	21	18, 493	267	11, 176	106
Amberjack	--------	--------	--------	--------	--------	--------	76	4
Barracuda	--------	--------	--------	--------	--------	--------	17	1
Black bass	--------	--------	--------	--------	101	13	509	54
Bluefish	344	54	3, 829	354	722	41	1, 901	167
Blue runner or hardtail	--------	--------	--------	--------	--------	--------	811	14
Bonito	143	12	912	58	120	6	10	(4)
Bowfin	--------	--------	--------	--------	--------	--------	25	(4)
Buffalofish	--------	--------	--------	--------	--------	--------	64	4
Butterfish	2, 109	218	5, 620	374	6, 443	383	76	2
Cabio	--------	--------	--------	--------	(4)	(4)	15	(4)
Carp	10	1	459	69	531	42	527	37
Catfish and bullheads	(4)	(4)	126	13	641	36	6, 299	283
Cero	--------	--------	--------	--------	--------	--------	32	2
Cigarfish	--------	--------	--------	--------	--------	--------	89	3
Cod	86, 999	2, 919	8, 872	254	56	2	--------	--------
Crappie	--------	--------	--------	--------	--------	--------	1, 008	40
Crevalle	(4)	(4)	--------	--------	--------	--------	271	8
Croaker	45	1	3, 040	102	16, 621	413	8, 014	129
Cunner	119	3	1	(4)	--------	--------	--------	--------

See footnotes at end of table.

Fisheries of the United States and Alaska, 1929—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued								
Cusk	4, 965	122	12	(4)	-----	-----	-----	-----
Dolphin	-----	-----	(4)	(4)	-----	-----	5	1
Drum:								
Black	-----	-----	26	(4)	51	1	1, 340	53
Red	-----	-----	29	1	11	(4)	3, 031	221
Eels	1, 273	126	920	120	382	39	127	8
Flounders	48, 933	2, 146	9, 954	441	468	28	1, 061	81
Frigate mackerel	3	(4)	-----	-----	-----	-----	-----	-----
Garfish	-----	-----	-----	-----	-----	-----	1	(4)
Gizzard shad	-----	-----	-----	-----	110	4	55	(4)
Goosefish	17	(4)	3	(4)	-----	-----	-----	-----
Grayfish	213	3	39	1	-----	-----	-----	-----
Groupers	-----	-----	6	(4)	-----	-----	4, 352	134
Grunts	-----	-----	-----	-----	-----	-----	89	4
Haddock	255, 851	8, 951	5, 802	191	-----	-----	-----	-----
Hake	26, 372	603	635	13	-----	-----	-----	-----
Halibut	3, 253	517	5	1	-----	-----	-----	-----
Harvestfish	-----	-----	-----	-----	-----	-----	616	14
Herring: Sea	107, 223	693	56	1	-----	-----	-----	-----
Hickory shad	3	(4)	3	(4)	163	9	416	27
Hogfish	-----	-----	-----	-----	-----	-----	4	(4)
Jewfish	-----	-----	2	(4)	-----	-----	144	12
Kingfish or "king mackerel"	-----	-----	-----	-----	-----	-----	4, 341	227
King whiting or "kingfish"	1	(4)	59	5	58	5	1, 309	53
Mackerel	62, 273	2, 303	1, 742	89	104	6	-----	-----
Menhaden	395	12	40, 546	169	99, 229	823	253, 235	1, 144
Minnows	30	10	171	6	-----	-----	-----	-----
Mojarro	-----	-----	-----	-----	-----	-----	550	22
Moonfish	-----	-----	-----	-----	-----	-----	(4)	(4)
Mullet	-----	-----	23	2	67	4	33, 661	1, 328
Mummichog	4	(4)	82	10	-----	-----	-----	-----
Muttonfish	-----	-----	-----	-----	-----	-----	226	19
Paddlefish	-----	-----	-----	-----	-----	-----	3	(4)
Permit	-----	-----	-----	-----	-----	-----	18	1
Pigfish	-----	-----	2	(4)	4	(4)	298	6
Pike (jacks)	-----	-----	1	(4)	19	4	16	2
Pilotfish	-----	-----	4	(4)	-----	-----	-----	-----
Pinfish	-----	-----	-----	-----	-----	-----	152	4
Pollock	14, 257	369	99	3	-----	-----	-----	-----
Pompano	-----	-----	(4)	(4)	(4)	(4)	508	107
Porpoise	(4)	(4)	-----	-----	-----	-----	-----	-----
Porkfish	-----	-----	-----	-----	-----	-----	1	(4)
Rosefish	74	1	(4)	(4)	-----	-----	-----	-----
Salmon: Atlantic	44	15	-----	-----	-----	-----	-----	-----
Scup	2, 918	160	8, 994	220	232	16	161	5
Sea bass	259	26	3, 225	179	94	9	666	54
Sea robin	285	5	63	1	2	(4)	-----	-----
Shad	461	43	622	118	9, 525	1, 602	3, 347	620
Sharks	55	1	34	1	-----	-----	176	2
Sheepshead, salt-water	-----	-----	1	(4)	-----	-----	1, 217	59
Silversides	-----	-----	223	11	-----	-----	-----	-----
Skates	1, 256	17	93	2	2	(4)	-----	-----
Skipper	4	1	-----	-----	-----	-----	-----	-----
Smelt	895	192	9	2	-----	-----	-----	-----
Snapper:								
Mangrove	-----	-----	-----	-----	-----	-----	267	14
Red	-----	-----	18	6	-----	-----	9, 969	816
Snook	-----	-----	-----	-----	-----	-----	693	35
Spadefish	-----	-----	-----	-----	-----	-----	104	4
Spanish mackerel	-----	-----	78	10	21	2	6, 215	393
Spot	-----	-----	293	12	989	54	3, 713	95
Squeteagues	162	19	10, 884	465	11, 389	487	11, 330	875
Squirrelfish	-----	-----	-----	-----	-----	-----	2	(4)
Striped bass	44	9	207	40	1, 581	272	246	41
Sturgeon and sturgeon roe	7	1	22	6	9	2	40	8
Suckers	121	8	131	16	-----	-----	(4)	(4)
Sunfish	-----	-----	2	(4)	2	(4)	538	16
Swellfish	51	4	-----	-----	-----	-----	-----	-----
Swordfish	6, 069	908	324	34	-----	-----	-----	-----
Tautog	534	38	114	7	(4)	(4)	1	(4)
Tenpounder	-----	-----	-----	-----	-----	-----	281	7
Thimble-eyed mackerel	16	(4)	405	7	-----	-----	-----	-----
Tilefish	1, 977	104	2, 644	115	-----	-----	-----	-----

See footnotes at end of table.

Fisheries of the United States and Alaska, 1929—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued								
Tomcod	24	1	147	6	1	(4)		
Tripletail							14	1
Tuna and tunalike fishes:								
Albacore			76	2			1	(4)
Horse mackerel	222	19	114	8				
Turbot							(4)	(4)
Whitebait			93	7				
Whiting	10, 278	155	6, 649	126	122	6		
Wolffish	1, 536	48	1	(4)				
Yellow perch	(4)	(4)	67	8	160	15	102	7
Yellowtail							180	13
Wahoo			2	(4)				
White perch	21	3	182	26	542	42	221	15
Total	646, 541	20, 881	120, 025	3, 733	169, 065	4, 633	375, 963	7, 402
SHELLFISH, ETC.								
Clams:								
Cockle	45	7						
Hard	3, 448	1, 082	2, 353	931	986	374	1, 148	114
Razor	127	16	3	1				
Soft	8, 956	887	816	174				
Surf			249	35				
Conchs			66	5			6	(4)
Crabs:								
Hard	4, 949	117	332	17	55, 833	1, 035	5, 451	152
King			6, 260	15				
Rock			1	(4)				
Soft	1	(4)	26	7	4, 345	434	448	82
Stone							227	23
Lobsters:								
Common	10, 322	3, 132	1, 425	376				
Spiny							413	37
Mussels, sea	10	1	185	10				
Octopus							1	(4)
Oysters: Eastern	11, 350	1, 984	55, 129	8, 090	43, 113	4, 891	41, 805	1, 691
Periwinkle	79	17						
Scallops:								
Bay	1, 597	578	620	178	1, 146	208	710	46
Sea	825	230	1, 667	350				
Sea urchins	3	(4)						
Shrimp	3	2	554	32			108, 550	4, 435
Squid	5, 646	128	902	36	183	6	2	(4)
Terrapin			3	3			105	40
Turtles			25	2	3	(4)	37	2
Frogs			(4)	(4)				
Irish moss	144	9						
Kelp	240	1						
Sponges							529	880
Bloodworms			74	85				
Sandworms			58	58				
Total	47, 745	8, 191	70, 748	10, 405	105, 609	6, 948	159, 432	7, 502
Grand total	694, 286	29, 072	190, 773	14, 138	274, 674	11, 581	535, 395	14, 904

See footnotes at end of table.

Fisheries of the United States and Alaska, 1929—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Pacific		Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH										
Alewives									35, 290	434
Amberjack									76	4
Anchovies	386	5							386	5
Barracuda	5, 229	530							5, 246	531
Black bass					74	11			684	78
Bluefish									6, 796	616
Blue pike			2, 835	189					2, 835	189
Blue runner or hardtail									811	14
Bonito									1, 185	76
Bowfin			32	1	190	6			247	7
Buffalofish			2	(4)	17, 267	1, 014			17, 333	1, 018
Butterfish									14, 248	977
Burbot			612	12					612	12
Cabio									15	(4)
Carp	472	14	2, 017	69	18, 338	872			22, 354	1, 104
Catfish and bullheads	506	73	682	72	8, 093	713			16, 347	1, 190
Cero									32	2
Chubs			5, 601	589					5, 601	589
Cigarfish									89	3
Cisco			128	19					128	19
Cod	18, 447	351					2, 278	15	116, 652	3, 541
Crappie			3	1	512	49			1, 523	90
Crevalle									271	8
Croaker									27, 720	645
Cunner									120	3
Cusk									4, 977	122
Dolly Varden trout							73	8	73	8
Dolphin									5	1
Drum:										
Black									1, 417	54
Red									3, 071	222
Eels	(4)	(4)	63	6	16	1			2, 781	300
Flounders	14, 913	783							75, 329	3, 479
Frigate mackerel									3	(4)
Garfish									1	(4)
Gizzard shad									165	4
Goldeye			(4)	(4)					(4)	(4)
Goldfish			10	(4)					10	(4)
Goosefish									20	(4)
Grayfish	1, 120	12							1, 372	16
Groupers									4, 358	134
Grunts									89	4
Haddock									261, 653	9, 142
Hake	146	3							27, 153	619
Halibut	10, 420	1, 472					41, 619	4, 423	55, 297	6, 413
Hardhead	55	8							55	8
Harvestfish									616	14
Herring:										
Sea	1, 873	17					153, 106	1, 148	262, 258	1, 859
Lake			21, 098	621					21, 098	621
Hickory shad									585	36
Hogfish									4	(4)
Horse mackerel	709	19							709	19
Jewfish									146	12
Kingfish (California)	476	13							476	13
Kingfish or "king mackerel"									4, 341	227
King whiting or "kingfish"									1, 427	63
Lake trout			11, 949	1, 745					11, 949	1, 745
"Lingcod"	2, 487	93					61	1	2, 548	94
Mackerel	57, 975	879							122, 094	3, 277
Menhaden									393, 405	2, 148
Minnows									201	16
Mojarro									550	22
Mooneye			16	1	3	(4)			19	1
Moonfish									(4)	(4)
Mullet	65	6							33, 816	1, 340
Mummichog									86	10
Muttonfish									226	19
Paddlefish					1, 411	163			1, 414	163
Permit									18	1
Pigfish									304	6

See footnotes at end of table.

Fisheries of the United States and Alaska, 1929—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Pacific		Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—Continued										
Pike (jacks)			500	33	20	2			556	41
Pilchard	651, 802	3, 588							651, 802	3, 588
Pilotfish									4	(4)
Pinfish									152	4
Pollock									14, 356	372
Pompano	25	4							533	111
Porpoise									(4)	(4)
Porkfish									1	(4)
Quillback					765	59			765	59
Rock bass	483	35	39	2	3	(4)			525	37
Rockfishes	6, 677	334					1	(4)	6, 678	334
Rosefish									74	1
Sablefish	3, 666	189					694	23	4, 360	212
Salmon:										
Atlantic									44	15
Blueback, red or sockeye	10, 602	1, 479					155, 116	4, 633	165, 718	6, 112
Chinook or king	34, 948	4, 443					15, 189	589	50, 137	5, 032
Chum or keta	22, 722	578					84, 552	1, 218	107, 274	1, 796
Humpback or pink	51, 451	1, 523					170, 467	3, 984	221, 918	5, 507
Silver or coho	22, 170	1, 584					17, 278	418	39, 448	2, 002
Sauger pike			1, 636	129	5	1			1, 641	130
Sculpin	109	11							109	11
Scup									12, 305	401
Sea bass	404	23							4, 648	291
Sea bass, white (California)	1, 562	193							1, 562	193
Sea robin									350	6
Shad	3, 279	85							17, 234	2, 468
Sharks									265	4
Sheepshead:										4
Salt-water	288	14							1, 506	73
Fresh-water			2, 976	74	5, 261	290			8, 237	364
Silversides									223	11
Skates	428	8							1, 779	27
Skipper									4	1
Smelt	2, 450	106	(4)	(4)			8	1	3, 362	301
Snapper:										
Mangrove									267	14
Red									9, 987	822
Snook									693	35
Spadefish									104	4
Spanish mackerel									6, 314	405
Splittail	9	(4)							9	(4)
Spot									4, 995	161
Squawfish	3	(4)							3	(4)
Squeteagues									33, 765	1, 846
Squirrelfish									2	(4)
Steelhead trout	3, 206	301					48	4	3, 254	305
Striped bass	541	80							2, 619	442
Sturgeon and sturgeon roe	192	19	7	3	11	1			288	40
Sturgeon, shovel-nosed					229	23			229	23
Suckers	1	(4)	5, 915	251	700	63			6, 868	338
Sunfish			9	1	375	25			926	42
Surffishes	473	23							473	23
Swellfish									51	4
Swordfish	693	89							7, 086	1, 031
Tautog									649	45
Tenpounder									281	7
Thimble-eyed mackerel									421	7
Tilefish									4, 621	219
Tomcod	21	1							193	8
Tripletail									14	1
Tullibee			574	23					574	23
Tuna and tunalike fishes:										
Albacore	269	40							346	42
Bluefin	7, 527	490							7, 527	490
Bonito	2, 918	98							2, 918	98
Skipjack or striped	26, 998	1, 081							26, 998	1, 081
Yellowfin	37, 399	2, 200							37, 399	2, 200
Horse mackerel									336	27
Turbot									(4)	(4)
White bass			156	9	65	5			221	14

See footnotes at end of table.

Fisheries of the United States and Alaska, 1929—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Pacific		Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued										
Whitebait	243	16							336	23
Whitefish	202	12	10, 132	1, 689					10, 334	1, 701
Whitefish, Menominee			533	35					533	35
Whiting									17, 049	287
Wolffish									1, 537	48
Yellow bass					8	1			8	1
Yellow perch			8, 013	466	22	2			8, 364	498
Yellow pike			2, 384	394	25	4			2, 409	398
Yellowtail	3, 075	150							3, 255	163
Wahoo									2	(4)
White perch									966	86
Miscellaneous fish	614	22			73	5			687	27
Total	1,012,729	23, 097	77, 922	6, 434	53, 466	3, 310	640, 490	16, 465	3,096,201	85, 955
SHELLFISH, ETC.										
Abalone	694	139							694	139
Clams:										
Cockle	9	4							54	11
Hard	193	29							8, 128	2, 530
Pismo	27	10							27	10
Razor	1, 106	200					704	41	1, 940	258
Soft	26	11							9, 798	1, 072
Surf	2	1							251	36
Conchs									72	5
Crabs:										
Hard	3, 817	307					399	36	70, 781	1, 664
King									6, 260	15
Rock									1	(4)
Soft									4, 820	523
Stone									227	23
Crawfish	146	18	52	4	8	1			206	23
Lobsters:										
Common									11, 747	3, 508
Spiny	1, 392	274							1, 805	311
Mussels, sea	(4)	(4)							195	11
Mussel shells			7, 415	329	46, 937	996			54, 352	1, 325
Octopus	175	13							176	13
Oysters:										
Eastern	53	28							151, 450	16, 684
Western	627	367							627	367
Japanese	66	23							66	23
Periwinkle									79	17
Scallops:										
Bay	67	21							4, 140	1, 031
Sea									2, 492	580
Sea urchins									3	(3)
Shrimp	3, 104	51			147	15	905	40	113, 263	4, 575
Squid	4, 661	76							11, 394	246
Pearls and slugs				21		101				122
Terrapin									108	43
Turtles	2	(4)			97	3			164	7
Frogs					232	20			232	20
Irish moss									144	9
Kelp									240	1
Sponges									529	880
Bloodworms									74	85
Sandworms									58	58
Miscellaneous shellfish					16	3			16	3
Total	16, 167	1, 572	7, 467	354	47, 437	1, 139	2, 008	117	456, 613	36, 228
WHALE PRODUCTS [5]										
Oil, sperm							358	18	358	18
Oil, whale	5, 330	365					5, 893	413	11, 223	778
Whale meal and scrap							2, 622	69	2, 622	69
Other whale products	208	4					52	2	260	6
Total	5, 538	369					8, 925	502	14, 463	871
Grand total	1,034,434	25, 038	85, 389	6, 788	100, 903	4, 449	651, 423	17, 084	3,567,277	123, 054

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[2] Salt fish have been converted to the basis of round weight.

[3] Includes the catch of fish taken in Lake Okeechobee, Fla.

[4] Less than 500 pounds or dollars.

[5] The weight of the whales caught was not determined; therefore, the weight of the manufactured product is shown.

Fisheries of the United States and Alaska, 1929—Continued

CATCH: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

States	Marine and coastal rivers		Mississippi River and tributaries		Lakes[6]		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alabama	9, 025	410	1, 045	33			10, 070	443
Arkansas			17, 544	678			17, 544	678
California	856, 926	12, 871					856, 926	12, 871
Connecticut	54, 878	3, 636					54, 878	3, 636
Delaware	33, 470	336					33, 470	336
Florida	142, 125	5, 940			3, 828	180	145, 953	6, 120
Georgia	43, 514	877					43, 514	877
Illinois			17, 585	945	611	76	18, 196	1, 021
Indiana			4, 671	254	1, 016	73	5, 687	327
Iowa			8, 688	404			8, 688	404
Kansas			178	21			178	21
Kentucky			3, 044	174			3, 044	174
Louisiana	61, 920	2, 765	11, 794	597			73, 714	3, 362
Maine	162, 940	4, 897					162, 940	4, 897
Maryland	63, 388	4, 295					63, 388	4, 295
Massachusetts	447, 689	18, 053					447, 689	18, 053
Michigan					33, 373	3, 248	33, 373	3, 248
Minnesota			5, 272	224	11, 470	502	16, 742	726
Mississippi	34, 629	1, 005	3, 789	208			38, 418	1, 213
Missouri			2, 047	115			2, 047	115
Nebraska			135	15			135	15
New Hampshire	378	52					378	52
New Jersey	110, 001	8, 731					110, 001	8, 731
New York	47, 259	5, 062			1, 590	205	48, 849	5, 267
North Carolina	217, 595	2, 544					217, 595	2, 544
Ohio			1, 371	59	15, 823	981	17, 194	1, 040
Oklahoma			354	31			354	31
Oregon	25, 284	2, 605					25, 284	2, 605
Pennsylvania	42	9		(7)	1, 343	163	1, 385	172
Rhode Island	28, 401	2, 435					28, 401	2, 435
South Carolina	6, 135	275					6, 135	275
South Dakota			767	18			767	18
Tennessee			13, 132	320			13, 132	320
Texas	16, 624	907	1, 808	55			18, 432	962
Virginia	211, 286	7, 286					211, 286	7, 286
Washington	152, 224	9, 563					152, 224	9, 563
West Virginia			45	7			45	7
Wisconsin			7, 634	291	20, 164	1, 539	27, 798	1, 830
Alaska	651, 423	17, 084					651, 423	17, 084
Total	3, 377, 156	111, 638	100, 903	4, 449	89, 218	6, 967	3, 567, 277	123, 054

[6] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee, and several mussel-bearing streams tributary to Lakes Huron and Michigan.

[7] Less than $500.

Industries related to the fisheries of the United States and Alaska, 1929[1]

Items	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf	Pacific
Transporting:					
Persons engaged—					
On vessels	404	100	855	367	310
On boats		184		390	
Total	404	284	855	757	310
Vessels					
Steam	2		2		1
Net tonnage	67		175		32
Motor	148	32	412	152	119
Net tonnage	1, 878	511	5, 296	1, 461	2, 383
Sail	4		45	41	5
Net tonnage	443		1, 527	402	1, 818
Total vessels	154	32	459	193	125
Total net tonnage	2, 388	511	6, 998	1, 868	4, 233
Boats		221		280	
Wholesale:					
Establishments	292	345	450	498	120
Persons engaged	3, 995	3, 747	6, 498	3, 394	1, 373
Salaries and wages	$5, 285, 740	$5, 347, 875	$2, 727, 048	$1, 835, 556	$2, 300, 500
Manufacturing:					
Establishments	162	56	58	174	169
Persons engaged	7, 872	815	1, 459	4, 908	10, 304
Salaries and wages	$3, 651, 253	$891, 225	$599, 327	$2, 319, 890	$6, 859, 656
Products	$15, 888, 289	$8, 174, 922	$2, 887, 647	$13, 341, 563	$50, 498, 558
Products prepared by the fishermen	$111, 145		$13, 624	$107, 871	(6)

See footnotes at end of table.

Industries related to the fisheries of the United States and Alaska, 1929—Con.

Items	Mississippi River and tributaries	Lakes	Alaska	Total
Transporting:				
Persons engaged—				
On vessels	27	77	1, 716	3, 856
On boats			(2)	574
Total	27	77	1, 716	4, 430
Vessels:				
Steam		6	24	35
Net tonnage		220	32, 415	32, 909
Motor	13	30	390	1, 296
Net tonnage	114	364	14, 261	26, 268
Sail			2	97
Net tonnage			3, 555	7, 745
Total vessels	13	36	416	1, 428
Total net tonnage	114	584	50, 231	66, 922
Boats			[3] 999	1, 500
Wholesale:				
Establishments	142	151	(4)	[5] 1, 998
Persons engaged	1, 216	1, 352	(4)	[5] 21, 175
Salaries and wages	$1, 154, 281	$2, 468, 520	(4)	[5] $21, 119, 520
Manufacturing:				
Establishments	10	33	(4)	[5] 662
Persons engaged	183	253	(4)	[5] 25, 794
Salaries and wages	$208, 460	$277, 146	(4)	[5] $14, 806, 957
Products	$141, 067	$1, 817, 054	$45, 425, 871	$138, 174, 971
Products prepared by the fishermen	(6)	$211, 671	(6)	(6)

[1] Data for the Mississippi River and tributaries are for 1922; the pearl-button industry is not included.
[2] Included on vessels.
[3] Includes scows, houseboats, and pile drivers.
[4] Detailed statistics not available. There were 42 establishments engaged in handling fresh and frozen fish; 103, in curing fish; 158, in canning fish; and 23 in manufacturing by-products. There were 262 plants operating in Alaska exclusive of duplication. There were 16,646 persons employed in these establishments.
[5] Exclusive of Alaska.
[6] Data not available.

Yield of the marine fisheries of the United States, 1929: By gear

Gear	New England		Middle Atlantic		Chesapeake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	75, 304, 276	$2, 005, 178	46, 891, 180	$397, 187	98, 632, 175	$863, 461
Haul seines	24, 353, 164	230, 484	3, 320, 772	210, 441	3, 244, 938	213, 504
Gill nets	26, 504, 035	897, 924	4, 367, 345	342, 108	4, 021, 551	466, 839
Lines	140, 324, 673	4, 890, 199	12, 647, 820	588, 208	45, 696, 280	812, 122
Pounds nets	17, 734, 247	433, 913	35, 317, 598	1, 260, 164	61, 349, 005	2, 954, 492
Floating traps	12, 268, 834	566, 315				
Weirs	50, 792, 772	300, 413	1, 496, 000	3, 931		
Stop nets			180, 847	28, 152	9, 525	1, 429
Fyke nets	245, 445	22, 836	2, 056, 909	76, 237	866, 652	61, 512
Dip nets	7, 483, 687	108, 457	72, 321	13, 247	2, 323, 242	171, 686
Cast nets			7, 934	1, 285	40, 000	5, 040
Bow and scap nets			83, 474	8, 462		
Bag nets	162, 907	29, 971	20, 520	3, 005		
Drag nets			140, 750	13, 800		
Push nets	32, 046	13, 173	20, 870	5, 866		
Pocket nets	1, 250	250				
Otter trawls	290, 029, 364	10, 519, 500	19, 215, 366	741, 552	599, 000	31, 145
Traps	23, 400	3, 456				
Pots	15, 948, 472	3, 329, 945	2, 856, 516	482, 093	267, 320	27, 771
Harpoons	6, 199, 960	920, 275	324, 134	34, 471		
Spears	174, 068	21, 404	140, 867	17, 667	20, 500	1, 750
Scrapes, crab					5, 266, 576	316, 735
Dredges	14, 358, 936	2, 913, 444	56, 141, 709	8, 447, 575	17, 480, 868	1, 737, 143
Tongs	1, 880, 985	609, 855	2, 816, 058	671, 024	34, 525, 973	3, 851, 851
Rakes	1, 151, 636	363, 699	1, 610, 855	518, 160	282, 032	59, 284
Forks	4, 955, 709	326, 396	382, 876	207, 280		
Hoes	4, 111, 220	563, 649	138, 750	20, 937		
Picks					720	480
Gaffs			11, 214	1, 035		
Hooks	240, 000	1, 200				
By hand	5, 000	630	509, 926	43, 721	47, 080	4, 384
Total	694, 286, 086	29, 072, 566	190, 772, 611	14, 137, 608	274, 673, 437	11, 580, 628

Yield of the marine fisheries of the United States, 1929: By gear—Continued

Gear	South Atlantic and Gulf		Pacific		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	252, 945, 608	$1, 150, 498	292, 005, 058	$4, 504, 212	765, 778, 297	$8, 920, 536
Haul seines	36, 207, 543	1, 530, 788	5, 984, 125	545, 256	73, 110, 542	2, 730, 473
Gill nets	42, 097, 639	2, 255, 207	31, 519, 397	2, 899, 780	108, 509, 967	6, 861, 858
Trammel nets	5, 139, 424	355, 279	1, 057, 328	126, 630	6, 196, 752	481, 909
Lines	29, 828, 926	1, 783, 555	133, 546, 020	7, 757, 406	362, 043, 719	15, 831, 490
Pounds nets	16, 103, 962	538, 450	40, 499, 608	2, 959, 052	171, 004, 420	8, 146, 071
Floating traps	----------	----------	----------	----------	12, 268, 834	566, 315
Weirs	----------	----------	381, 400	2, 247	52, 670, 172	306, 591
Wheels	940	94	270, 937	28, 705	271, 877	28, 799
Stop nets	43, 500	2, 140	----------	----------	233, 872	31, 721
Fyke nets	1, 273, 793	70, 242	570, 273	76, 134	5, 013, 072	306, 961
Dip nets	514, 310	57, 800	1, 921, 732	83, 124	12, 315, 292	434, 314
Cast nets	144, 620	7, 960	----------	----------	192, 554	14, 285
Bow and scap nets	----------	----------	----------	----------	83, 474	8, 462
Bag nets	----------	----------	1, 506, 531	22, 598	1, 689, 958	55, 574
Drag nets	----------	----------	149, 910	16, 115	290, 660	29, 915
Push nets	----------	----------	----------	----------	52, 916	19, 039
Pocket nets	----------	----------	----------	----------	1, 250	250
Reef nets	----------	----------	172, 224	9, 100	172, 224	9, 100
Lampara nets	----------	----------	491, 545, 481	3, 336, 198	491, 545, 481	3, 336, 198
Paranzella nets	----------	----------	16, 211, 887	711, 775	16, 211, 887	711, 775
Otter trawls	105, 554, 396	4, 303, 117	----------	----------	415, 398, 126	15, 595, 314
Beam trawls	----------	----------	2, 364, 061	69, 187	2, 364, 061	69, 187
Traps	181, 642	7, 803	5, 717, 734	622, 137	5, 922, 776	633, 396
Pots	657, 346	53, 437	----------	----------	19, 729, 654	3, 893, 246
Harpoons	----------	----------	6, 207, 309	456, 761	12, 731, 403	1, 411, 507
Spears	231, 582	24, 930	----------	----------	567, 017	65, 751
Scrapes, crab	----------	----------	----------	----------	5, 266, 576	316, 735
Dredges	24, 513, 553	760, 400	----------	----------	112, 495, 066	13, 858, 562
Tongs	12, 852, 093	832, 411	745, 452	417, 922	52, 820, 561	6, 383, 063
Rakes	604, 735	61, 016	211	90	3, 649, 469	1, 002, 249
Forks	96, 320	8, 061	----------	----------	5, 434, 905	541, 737
Hoes	----------	----------	----------	----------	4, 249, 970	584, 586
Grabs	4, 749, 462	129, 384	----------	----------	4, 749, 462	129, 384
Picks	----------	----------	----------	----------	720	480
Gaffs	----------	----------	----------	----------	11, 214	1, 035
Shovels	----------	----------	1, 363, 259	254, 626	1, 363, 259	254, 626
Hooks	285, 263	233, 012	----------	----------	525, 263	234, 212
Diving outfits, abalone or sponge	314, 748	652, 441	693, 729	139, 359	1, 008, 477	791, 800
By hand	1, 053, 454	85, 920	----------	----------	1, 615, 460	134, 655
Total	535, 394, 859	14, 903, 945	1,034,433,666	25, 038, 414	2,729,560,659	94, 733, 161

Yield of the fisheries of the United States, 1880 to 1929

[Expressed in thousands of pounds; that is, 000 omitted]

Year	New England States	Middle Atlantic States	Chesapeake States	South Atlantic States	Gulf States
1880	*589, 764*	*408, 202*	*254, 587*	*42, 952*	*23, 561*
1881	579, 828	380, 434	247, 591	44, 741	24, 664
1882	569, 892	352, 666	240, 595	46, 530	25, 767
1883	559, 956	324, 898	233, 599	48, 319	26, 870
1884	550, 020	297, 130	226, 603	50, 108	27, 973
1885	540, 084	269, 362	219, 607	51, 897	29, 076
1886	530, 148	241, 594	212, 611	53, 686	30, 179
1887	*520, 214*	*213, 825*	*205, 617*	55, 475	*31, 285*
1888	*572, 908*	*276, 755*	*216, 107*	57, 264	*54, 844*
1889	*653, 170*	*275, 323*	272, 648	*59, 051*	*65, 395*
1890	624, 313	*299, 104*	*329, 188*	*67, 202*	*69, 075*
1891	595, 456	*265, 283*	*325, 172*	69, 086	68, 544
1892	566, 599	259, 001	332, 074	70, 970	68, 013
1893	537, 742	252, 719	338, 976	72, 854	67, 482
1894	508, 885	246, 437	345, 878	74, 738	66, 951
1895	480, 028	240, 155	352, 780	76, 622	66, 420
1896	451, 171	233, 873	359, 682	78, 506	65, 889
1897	422, 314	*227, 590*	*366, 582*	*80, 390*	*65, 361*
1898	*393, 458*	260, 164	390, 226	85, 601	75, 028
1899	428, 611	292, 738	413, 870	90, 812	84, 695
1900	463, 765	325, 312	437, 514	96, 023	94, 362
1901	498, 919	*357, 888*	*461, 159*	101, 234	104, 029
1902	*534, 075*	363, 729	452, 921	*106, 446*	*113, 696*
1903	516, 145	369, 570	444, 683	116, 518	114, 459
1904	498, 215	*375, 412*	*436, 445*	126, 590	115, 222
1905	*480, 284*	336, 921	433, 911	136, 662	115, 985
1906	496, 866	298, 430	431, 377	146, 734	116, 748
1907	513, 448	259, 939	428, 843	156, 806	117, 511

Yield of the fisheries of the United States, 1880 to 1929—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	New England States	Middle Atlantic States	Chesapeake States	South Atlantic States	Gulf States
1908	*530,029*	*221,450*	*426,311*	*166,875*	*118,274*
1909	524,330	230,026	435,014	183,449	119,539
1910	518,631	238,602	443,717	200,023	120,804
1911	512,932	247,178	452,420	216,597	122,069
1912	507,233	255,754	461,123	233,171	123,334
1913	501,534	264,330	469,826	249,745	124,599
1914	495,835	272,906	478,529	266,319	125,864
1915	490,136	281,482	487,232	282,893	127,129
1916	484,437	290,058	495,935	299,467	128,394
1917	478,738	298,634	504,638	316,041	129,659
1918	473,039	307,210	513,341	*332,614*	*130,924*
1919	*467,340*	315,786	522,044	311,841	136,804
1920	455,236	324,362	*530,750*	291,068	142,684
1921	443,132	*332,932*	491,241	270,295	148,564
1922	431,028	299,948	451,732	249,522	154,444
1923	418,924	266,964	412,223	*228,747*	*160,324*
1924	*406,822*	233,980	372,714	236,727	169,169
1925	456,016	200,996	*333,206*	244,707	178,014
1926	505,210	*168,013*	318,573	252,687	186,859
1927	554,404	175,600	303,940	*260,669*	*195,705*
1928	*603,598*	183,187	289,307	*258,440*	*191,007*
1929	*694,286*	*190,773*	*274,674*	*337,046*	*198,349*

Year	Pacific States	Mississippi River drainage States	Lake States	Total United States
1880	*186,442*	44,545	*64,736*	1,614,789
1881	174,542	44,545	71,757	1,568,102
1882	162,642	44,545	78,778	1,521,415
1883	150,742	44,545	85,799	1,474,728
1884	138,842	*44,545*	92,820	1,428,041
1885	126,942	48,028	*99,842*	1,384,838
1886	115,042	51,511	102,653	1,337,424
1887	103,142	54,994	105,464	1,290,016
1888	*91,244*	58,477	108,275	1,435,874
1889	99,415	61,960	111,086	1,598,048
1890	107,586	65,443	*113,899*	1,675,810
1891	115,757	68,926	108,139	1,616,363
1892	*123,928*	72,409	102,379	1,595,373
1893	131,912	75,892	*96,620*	1,574,197
1894	139,896	79,375	99,471	1,561,631
1895	*147,879*	82,858	102,322	1,549,064
1896	166,627	86,341	105,173	1,547,262
1897	185,375	89,824	108,024	1,545,460
1898	204,123	93,307	110,875	1,612,782
1899	*222,872*	*96,797*	*113,727*	1,744,122
1900	213,000	95,941	106,844	1,832,761
1901	203,128	95,085	99,961	1,921,403
1902	193,256	94,229	93,078	1,951,430
1903	183,384	*93,374*	*86,195*	1,924,328
1904	*173,512*	104,356	90,682	1,920,434
1905	173,898	115,338	94,369	1,887,368
1906	174,284	126,320	98,456	1,889,215
1907	174,670	137,302	102,543	1,891,062
1908	*175,054*	*148,284*	*106,631*	1,892,908
1909	190,363	145,245	98,967	1,926,933
1910	205,672	142,206	91,303	1,960,958
1911	220,981	139,167	83,639	1,994,983
1912	236,290	136,128	75,975	2,029,008
1913	251,599	133,089	*68,309*	2,063,031
1914	266,908	130,050	*98,625*	2,135,035
1915	*282,220*	127,011	*108,948*	2,187,051
1916	282,065	123,972	*88,432*	2,192,760
1917	281,910	120,933	*95,893*	2,226,446
1918	281,755	117,894	*106,679*	2,263,456
1919	281,600	114,855	*92,463*	2,242,733
1920	281,445	111,816	*77,375*	2,214,736
1921	281,290	108,777	*83,458*	2,159,689
1922	*281,137*	*105,734*	*79,434*	2,052,979
1923	*404,948*	105,043	*79,109*	2,076,282
1924	*473,695*	104,353	*78,281*	2,075,741
1925	*610,996*	103,663	*69,132*	2,196,730
1926	*521,286*	102,973	*75,300*	2,130,901
1927	*651,197*	102,283	*81,327*	2,325,125
1928	*693,484*	101,593	*63,368*	2,383,984
1929	*1,034,434*	[1] *100,903*	*85,389*	2,915,854

[1] Data includes production of mussel shells for 1929 and other products for 1922.

NOTE.—Figures for 1908 collected by the Bureau of the Census. Figures in italics were obtained by actual canvass.

CANNED FISHERY PRODUCTS AND BY-PRODUCTS TRADE

The output of canned fishery products and by-products in the United States and Alaska in 1930 was valued at $106,579,039. Of the total, canned products comprised $82,858,261 and by-products $23,720,778, a decrease of 18 per cent in the value of canned products and a decrease of less than one-half of 1 per cent in the value of by-products when compared with the respective values of the same groups for the previous year. (The value of by-products for 1930 is not comparable directly with that for 1929, since statistics on the output of marine pearl-shell products were not obtained in 1929.)

Fishery products were canned at 464 establishments in the United States and Alaska in 1930. The combined output of these canneries amounted to 14,767,186 standard cases. The net weight of the products canned amounted to 576,685,454 pounds.

Canned fishery products or by-products were prepared in 27 States and Alaska during 1930. Alaska ranked first in the value of these products, accounting for 30 per cent of the total. Canned salmon was the leading product manufactured there. California, with her important sardine and tuna canning industries, ranked second with 25 per cent of the total value; and Washington, with an important salmon industry, ranked third with 9 per cent of the total value. Maine, where canned sardines were the most important commodity, ranked fourth with 6 per cent of the total value. Considering the output by geographical sections, the Pacific coast and Alaska accounted for 68 per cent of the total value of canned products and by-products.

Canned fishery products and by-products of the United States and Alaska, 1930

SUMMARY OF PRODUCTION: BY COMMODITIES

Products	Number of plants	Standard cases	Pounds	Value
Canned products:				
Salmon—				
United States	45	1, 054, 001	50, 592, 048	$13, 140, 081
Alaska	149	5, 032, 478	241, 558, 944	29, 695, 872
Sardines—				
Maine	33	1, 399, 212	34, 980, 300	4, 459, 071
California	29	2, 979. 333	143, 007, 984	8, 741, 928
Tuna and tunalike fishes	15	2, 010, 640	48, 255, 360	13, 055, 876
Alewives	18	73, 117	3, 509, 616	223, 065
Alewife roe	34	60, 367	2, 897, 616	303, 559
Shad	14	12, 245	587, 760	42, 190
Shad roe	10	3, 339	160, 272	69, 579
Mackerel	15	109, 322	5, 247, 456	396, 027
Fish flakes	6	62, 322	2, 991, 456	617, 203
Fish cakes, balls, etc	9	122, 281	5, 869, 488	1, 003, 501
Miscellaneous fish	16	23, 369	1, 121, 712	117, 900
Salmon eggs (for bait)	7	3, 613	173, 424	96, 381
Sturgeon caviar	7	7, 993	383, 664	1. 007, 345
Whitefish roe and caviar	5	866	41, 568	25, 599
Miscellaneous roe and caviar	6	16, 300	782, 400	117, 161
Oysters	48	396, 174	5, 942, 610	1, 836, 862
Shrimp	69	818, 491	13, 482, 492	4, 960, 542
Clam products	62	558, 884	[1] 14, 003, 012	2, 666, 045
Crabs	4	1, 545	74, 160	56, 370
Miscellaneous shellfish	8	21, 294	1, 022, 112	226, 104
Total	[2] 464	14, 767, 186	576, 685, 454	82, 858, 261

[1] "Cutout" or "Drained" weights of can contents are included for whole and minced clams, and gross can contents for chowder, soup, bouillon, broth, juice, and cocktail.

[2] Exclusive of duplication.

Canned fishery products and by-products of the United States and Alaska, 1930—Continued

SUMMARY OF PRODUCTION: BY COMMODITIES—Continued

Products	Quantity	Value
By-products:		
Oyster-shell products ... tons	347, 056	$2, 595, 252
Fresh-water mussel-shell products		5, 007, 419
Marine pearl-shell products		4, 544, 147
Scrap, meal, etc ... tons	126, 605	5, 976, 669
Marine animal oils ... gallons	14, 704, 784	4, 200, 064
Miscellaneous by-products		1, 397, 227
Total		23, 720, 778
Grand total		106, 579, 039

VALUE OF PRODUCTION: BY STATES

States	Canned products	By-products[3]	Total
Maine	$5, 617, 085	$337, 753	$5, 954, 838
Massachusetts, Rhode Island, and Connecticut	1, 713, 291	3, 161, 910	4, 875, 201
New York and New Jersey	1, 854, 500	3, 729, 714	5, 584, 214
Pennsylvania		346, 762	346, 762
Delaware		637, 322	637, 322
Maryland	293, 733	723, 319	1, 017, 052
Virginia	354, 873	1, 443, 925	1, 798, 798
North Carolina	148, 419	350, 129	498, 548
South Carolina	633, 115	189, 635	822, 750
Georgia and Florida	1, 178, 371	1, 130, 071	2, 308, 442
Alabama	259, 696	46, 774	306, 470
Mississippi	1, 639, 767	293, 776	1, 933, 543
Louisiana	2, 601, 990	1, 084, 175	3, 686, 165
Texas and Wisconsin	494, 186	46, 235	540, 421
Missouri, Illinois, Tennessee, and Kentucky		68, 675	68, 675
Iowa		3, 559, 650	3, 559, 650
Washington	8, 980, 954	100, 044	9, 080, 998
Oregon	4, 792, 784	28, 280	4, 821, 064
California	22, 351, 816	4, 379, 102	26, 730, 918
Alaska	29, 943, 681	2, 063, 527	32, 007, 208
Total	82, 858, 261	23, 720, 778	106, 579, 039

[3] Including menhaden, fresh-water mussel-shell, and marine pearl-shell products.

Value of canned fishery products and by-products of the United States and Alaska, 1921 to 1930

Year	Canned products	By-products (including menhaden)	Total	Year	Canned products	By-products (including menhaden)	Total
1921	$46, 634, 706	$8, 351, 827	$54, 986, 533	1926	$86, 193, 240	$12, 133, 110	$98, 326, 350
1922	60, 464, 947	11, 390, 693	71, 855, 640	1927	81, 384, 133	12, 793, 256	94, 177, 389
1923	72, 445, 205	12, 634, 590	85, 079, 795	1928	95, 871, 855	14, 880, 956	110, 752, 811
1924	72, 164, 589	10, 308, 990	82, 473, 579	1929	101, 065, 055	23, 767, 656	124, 832, 711
1925	80, 577, 138	14, 600, 198	95, 177, 336	1930	82, 858, 261	23, 720, 778	106, 579, 039

CANNED PRODUCTS

The value of fishery products canned during 1930 was 18 per cent less than in the previous year. Salmon was the most important item and contributed 52 per cent to the total value. Sardines and tuna and tunalike fishes followed, each accounting for 16 per cent of the total value. The remainder of the value was made up principally of shrimp, clam products, oysters, sturgeon caviar, and fish cakes, balls, etc.

Pack of canned fishery products, standard cases, 1921 to 1930

Year	Salmon						Sardines: Maine and Massachusetts	
	Pacific Coast States		Alaska		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	1, 002, 948	$9, 234, 425	2, 596, 826	$19, 632, 744	3, 599, 774	$28, 867, 169	1, 399, 507	$3, 960, 916
1922	733, 246	8, 633, 524	4, 501, 652	29, 787, 193	5, 234, 898	38. 420, 717	1, 869, 719	5, 750, 109
1923	1, 367, 263	12, 660, 566	5, 035, 697	32, 873, 007	6, 402, 960	45, 533, 573	1, 272, 277	5, 288, 865
1924	958, 662	9, 394, 467	5, 294, 915	33, 007, 135	6, 253, 577	42, 401, 602	1, 899, 925	7, 191, 026
1925	1, 558, 613	15, 379, 976	4, 459, 937	31, 989, 531	6, 018, 550	47, 369, 507	1, 870, 786	6, 716, 701
1926	835, 738	10, 139, 302	6, 652, 882	46, 080, 004	7, 488, 620	56, 219, 306	1, 717, 537	6, 727, 388
1927	1, 504, 451	15, 712, 497	3, 572, 128	30, 016, 264	5, 076, 579	45, 728, 761	1, 262, 124	5, 249, 030
1928	842, 903	9, 254, 258	6, 083, 903	45, 383, 885	6, 926, 806	54, 638, 143	2, 055, 763	8, 076, 546
1929	1, 620, 523	15, 616, 312	5, 370, 159	40, 469, 385	6, 990, 682	56, 085, 697	2, 025, 801	6, 897, 946
1930	1, 054, 001	13, 140, 081	5, 032, 478	29, 695, 872	6, 086. 479	42, 835, 953	1, 399, 212	4, 459, 071

Year	Sardines: California		Tuna and tunalike fishes		Oysters	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	398, 668	$2, 346, 446	549, 150	$3, 074, 626	442, 086	$2, 179, 271
1922	715, 364	3, 361, 480	672, 321	4, 511, 873	505, 973	2, 423, 616
1923	1, 100, 162	4. 607, 931	817, 836	6, 914, 760	524, 544	2, 720, 073
1924	1, 367. 139	5, 445, 573	652, 416	5, 756, 586	447, 481	2, 478, 044
1925	1, 714. 913	6, 380, 617	1, 102, 471	8. 499, 080	654, 755	3, 721, 159
1926	2, 093, 278	7, 807. 404	851, 199	5, 282, 283	413, 834	2, 026, 569
1927	2, 563. 146	9, 268, 784	1, 255, 818	8, 368, 227	447, 297	2, 367, 949
1928	2, 771, 527	9, 658, 822	1, 216, 222	8, 374, 030	503, 952	2, 760, 576
1929	3, 831. 215	11, 996, 997	1. 504, 306	9, 873, 453	519, 145	2, 732, 478
1930	2, 979, 333	8, 741, 928	2, 010, 640	13, 055, 876	396, 174	1, 836, 862

Year	Shrimp		Clam products		Miscellaneous fishery products: Fish roe, caviar, and eggs	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	655, 364	$3, 804, 781	(1)	$1, 166, 507	(1)	(1)
1922	579, 797	3, 064. 087	(1)	1, 716, 365	(1)	(1)
1923	700, 429	4, 381, 534	(1)	1, 710, 616	(1)	(1)
1924	718, 517	4, 608, 950	(1)	2, 161, 389	(1)	(1)
1925	735, 714	3, 782, 819	(1)	1, 850, 378	(1)	(1)
1926	732, 365	4, 122, 092	(1)	2, 004, 650	(1)	(1)
1927	852, 764	5, 321, 652	525, 286	2, 744, 954	57, 586	$477, 415
1928	851, 831	5, 181, 547	531. 640	2, 623, 598	78, 394	681, 150
1929	909, 949	5, 528, 792	554, 639	2, 548, 472	46, 501	502, 040
1930	818, 491	4, 960, 542	558, 884	2, 666, 045	92, 478	1, 619, 624

Year	Miscellaneous fishery products						Grand total
	Other fish		Other shellfish		Total		
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Value*
1921	(1)	(1)	(1)	(1)	(1)	$1, 234, 990	$46, 634, 706
1922	(1)	(1)	(1)	(1)	(1)	1, 216, 700	60, 464, 947
1923	(1)	(1)	(1)	(1)	(1)	1, 287, 853	72, 445, 205
1924	(1)	(1)	(1)	(1)	(1)	2, 121, 419	72, 164, 589
1925	(1)	(1)	(1)	(1)	(1)	2, 256, 877	80, 577, 138
1926	(1)	(1)	(1)	(1)	(1)	2, 003, 548	86, 193. 240
1927	236, 579	$1, 765, 888	4, 479	$91, 473	298, 644	2, 334, 776	81, 384, 133
1928	683, 255	3, 703, 918	10, 590	173, 525	772, 239	4, 558, 593	95, 871, 855
1929	913, 088	4, 684, 879	14, 912	214, 301	974, 501	5. 401, 220	101, 065, 055
1930	402, 656	2, 399, 886	22, 839	282, 474	517, 973	4, 301, 984	82, 858, 261

[1] Not enumerated separately prior to 1927.

SALMON

In 1930 salmon was canned at 149 plants in Alaska, 31 in Washington, 12 in Oregon, and 2 in California. Compared with the previous year, this was a decrease of 7 plants in Alaska, 5 in Washington, and 3 in Oregon, and an increase of 1 in California. The combined output of the 194 plants amounted to 6,086,479 standard cases of forty-eight 1-pound cans valued at $42,835,953. Of the total, 1,054,001 cases, valued at $13,140,081, were packed in the Pacific Coast States, and 5,032,478 cases, valued at $29,695,872, in Alaska. The pack in the Pacific Coast States was 35 per cent less than in the year previous due mainly to the smaller pack in the Puget Sound district of humpback or pink salmon, as 1930 was an "off year." Compared with 1928, the previous "off year," there was an increase of 25 per cent in the pack. The pack in Alaska was 6 per cent less than the previous year.

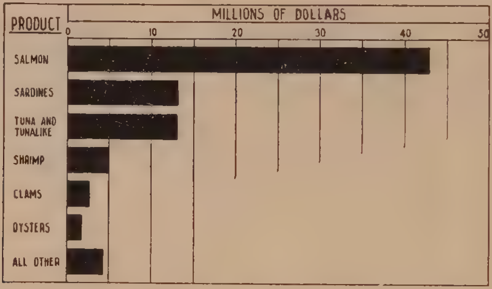

FIGURE 9.—Value of canned fishery products in the United States and Alaska, 1930

The world pack of canned salmon in 1930 amounted to 10,438,646 cases, which was an increase of 4 per cent as compared with that of the previous year. Of the total, 6,086,479 cases, or 58 per cent of the total, were packed in the United States and Alaska; 2,221,819 cases, or 21 per cent, in British Columbia; 1,751,944 cases, or 17 per cent, in Siberia; and 378,404 cases, or 4 per cent, in Japan.

Compared with the pack in 1929 there was a decrease of 13 per cent in the pack in the United States and Alaska, an increase of 59 per cent in the pack in British Columbia, an increase of 70 per cent in Siberia, and a decrease of 40 per cent in Japan. Statistics on the pack in British Columbia were obtained from the 1931 annual statistical number of the "Pacific Fisherman" and those for Siberia and Japan were obtained from the Mitsubishi Co., Seattle, Wash.

Pack of canned salmon, Pacific Coast States and Alaska, 1930, standard cases

Products	Alaska							
	Southeast		Central		Western		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	1, 441	$13, 265	8, 655	$82, 441	8, 300	$83, 185	18, 396	$178, 891
1-pound flat	2, 917	46, 672	9, 884	138, 756	10, 885	144, 740	23, 686	330, 168
½-pound flat	2, 581	48, 201	13, 521	209, 602	1, 738	31, 426	17, 840	289, 229
Total	6, 939	108, 138	32, 060	430, 799	20, 923	259, 351	59, 922	798, 288
Blueback, red or sockeye:								
1-pound tall	142, 785	1, 725, 461	193, 318	2, 290, 096	341, 464	4, 126, 874	677, 567	8, 142,431
1-pound flat	35, 927	464, 190	22, 247	264, 604	4, 798	57, 602	62, 972	786, 396
½-pound flat	42, 159	691, 637	53, 056	837, 467	15, 390	234, 227	110, 605	1, 763, 331
¼-pound flat	370	8, 883	--------	--------	--------	--------	370	8, 883
Total	221, 241	2, 890, 171	268, 621	3, 392, 167	361, 652	4, 418, 703	851, 514	10, 701, 041
Silver or coho:								
1-pound tall	143, 566	1, 243, 698	160, 333	1, 220, 055	3, 418	30, 979	307, 317	2, 494, 732
1-pound flat	5, 768	53, 347	158	1, 327	--------	--------	5, 926	54, 674
½-pound flat	5, 947	68, 515	12, 861	121, 460	--------	--------	18, 808	189, 975
¼-pound flat	371	5, 643	--------	--------	--------	--------	371	5, 643
Total	155, 652	1, 371, 203	173, 352	1, 342, 842	3, 418	30, 979	332, 422	2, 745, 024
Humpback or pink:								
1-pound tall	2, 230, 180	9, 255, 381	853, 733	3, 399, 277	17, 577	70, 114	3, 101, 490	12, 724, 772
1-pound flat	3, 647	17, 538	--------	--------	1, 220	4, 383	4, 867	21, 921
½-pound flat	75, 036	494, 141	6, 028	36, 006	--------	--------	81, 064	530, 147
¼-pound flat	1, 113	11, 581	--------	--------	--------	--------	1, 113	11, 581
Total	2, 309, 976	9, 778, 641	859, 761	3, 435, 283	18, 797	74, 497	3, 188, 534	13, 288, 421
Chum or keta:								
1-pound tall	277, 595	992, 989	282, 250	1, 009, 351	31, 705	113, 000	591, 550	2, 115, 340
½-pound flat	5, 883	32, 992	2, 501	13, 792	--------	--------	8, 384	46, 784
Total	283, 478	1, 025, 981	284, 751	1, 023, 143	31, 705	113, 000	599, 934	2, 162, 124
Steelhead:								
1-pound tall	122	854	30	120	--------	--------	152	974
Grand total	2, 977, 408	15, 174, 988	1, 618, 575	9, 624, 354	436, 495	4, 896, 530	5, 032, 478	29, 695, 872

Products	United States						Grand total, Alaska and United States	
	Washington		Oregon and California		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	13, 663	$118, 304	10, 189	$51, 675	23, 852	$169, 979	42, 248	$348, 870
1-pound oval	1, 039	23, 431	2, 011	46, 253	3, 050	69, 684	3, 050	69, 684
1-pound flat	17, 875	255, 503	49, 230	652, 829	67, 105	908, 332	90, 791	1, 238, 500
½-pound oval	101	2, 727	888	23, 976	989	26, 703	989	26, 703
½-pound flat	68, 306	1, 192, 382	145, 416	2, 465, 480	213, 722	3, 657, 862	231, 562	3, 947, 091
¼-pound flat	34	407	4, 504	58, 930	4, 538	59, 337	4, 538	59, 337
Total	101, 018	1, 592, 754	212, 238	3, 299, 143	313, 256	4, 891, 897	373, 178	5, 690, 185
Blueback, red or sockeye:								
1-pound tall	176, 062	2, 112, 744	--------	--------	176, 062	2, 112, 744	853, 629	10, 255, 175
1-pound flat	66, 683	866, 879	--------	--------	66, 683	866, 879	129, 655	1, 653, 275
½-pound flat	133, 499	2, 094, 787	5, 923	124, 383	139, 422	2, 219, 170	250, 027	3, 982, 501
¼-pound flat	--------	--------	--------	--------	--------	--------	370	8, 883
Total	376, 244	5, 074, 410	5, 923	124, 383	382, 167	5, 198, 793	1, 233, 681	15, 899, 834
Silver or coho:								
1-pound tall	72, 270	606, 512	24, 692	202, 474	96, 962	808, 986	404, 279	3, 303, 718
1-pound flat	41, 047	369, 423	35, 290	317, 610	76, 337	687, 033	82, 263	741, 707
½-pound flat	26, 420	290, 105	24, 714	271, 854	51, 134	561, 959	69, 942	751, 934
¼-pound flat	1, 804	28, 323	22, 172	346, 992	23, 976	375, 315	24, 347	380, 958
Total	141, 541	1, 294, 363	106, 868	1, 138, 930	248, 409	2, 433, 293	580, 831	5, 178, 317

Pack of canned salmon, Pacific Coast States and Alaska, 1930, standard cases—Continued

Products	United States						Grand total Alaska and United States	
	Washington		Oregon and California		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Humpback or pink:								
1-pound tall	17,455	$69,820			17,455	$69,820	3,118,945	$12,794,592
1-pound flat	60	285			60	285	4,927	22,206
½-pound flat	1,759	10,554			1,759	10,554	82,823	540,701
¼-pound flat							1,113	11,581
Total	19,274	80,659			19,274	80,659	3,207,808	13,369,080
Chum or keta:								
1-pound tall	57,014	199,186	8,055	$26,582	65,069	225,768	656,619	2,341,108
½-pound flat	7,187	36,169	594	3,089	7,781	39,258	16,165	86,042
Total	64,201	235,355	8,649	29,671	72,850	265,026	672,784	2,427,150
Steelhead:								
1-pound tall	2,349	23,490			2,349	23,490	2,501	24,464
1-pound oval	333	4,995	84	1,260	417	6,255	417	6,255
1-pound flat	1,309	18,326	2,843	39,802	4,152	58,128	4,152	58,128
½-pound oval	722	12,996	1,929	34,722	2,651	47,718	2,651	47,718
½-pound flat	1,744	27,110	6,732	107,712	8,476	134,822	8,476	134,822
Total	6,457	86,917	11,588	183,496	18,045	270,413	18,197	271,387
Grand total	708,735	8,364,458	345,266	4,775,623	1,054,001	13,140,081	6,086,479	42,835,953

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case.

Pack of canned salmon in the Pacific Coast States, 1921 to 1930

Year	Chinook or king		Blueback, red or sockeye		Silver or coho		Humpback or pink	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	335,854	$4,527,711	104,954	$1,905,647	111,643	$806,678	402,846	$1,732,847
1922	314,126	4,572,607	97,927	1,816,901	204,252	1,533,173	3,551	18,546
1923	384,705	5,790,419	105,336	1,955,549	245,548	1,608,627	445,175	2,211,742
1924	349,014	4,599,759	85,800	1,478,698	231,139	1,774,078	12,778	79,436
1925	432,638	5,990,019	118,387	2,065,975	307,567	3,313,060	551,375	3,152,342
1926	349,600	5,281,404	75,711	1,474,722	228,141	2,223,499	2,608	19,609
1927	405,319	6,192,368	123,826	2,170,385	210,537	2,212,763	586,598	3,865,797
1928	282,867	4,645,366	73,204	1,075,826	152,137	1,344,796	6,101	45,464
1929	279,757	4,741,212	129,215	2,210,581	198,778	2,039,050	727,660	4,876,631
1930	313,256	4,891,897	382,167	5,198,793	248,409	2,433,293	19,274	80,659

Year	Chum or keta		Steelhead		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	35,132	$127,659	12,519	$133,883	1,002,948	$9,234,425
1922	87,583	365,303	25,797	326,994	733,246	8,633,524
1923	154,342	769,839	32,157	324,390	1,367,263	12,660,566
1924	247,858	1,192,156	32,073	270,340	958,662	9,394,467
1925	133,368	641,310	15,278	217,270	1,558,613	15,379,976
1926	148,732	758,843	30,946	381,225	835,738	10,139,302
1927	145,356	852,120	32,815	419,064	1,504,451	15,712,497
1928	309,536	1,880,405	19,058	262,401	842,903	9,254,258
1929	262,106	1,418,393	23,007	330,445	1,620,523	15,616,312
1930	72,850	265,026	18,045	270,413	1,054,000	13,140,081

NOTE.—Shown in standard cases of forty-eight 1-pound cans.

Pack of canned salmon in Alaska, 1921 to 1930

Year	Chinook or King		Blueback, red or sockeye		Silver or coho	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	44, 994	$459, 897	1, 765, 798	$15, 841, 404	106, 555	$600, 140
1922	30, 660	247, 673	2, 070, 658	19, 135, 696	175, 993	962, 790
1923	38, 343	328, 270	1, 859, 496	17, 253, 792	164, 107	943, 318
1924	33, 648	299, 009	1, 447, 895	13, 803, 932	183, 601	1, 254, 551
1925	49, 978	595, 041	1, 059, 676	13, 904, 599	161, 010	1, 565, 759
1926	52, 476	544, 246	2, 157, 087	21, 328, 739	202, 527	1, 700, 563
1927	70, 391	791, 653	1, 320, 195	15, 954, 485	253, 044	2, 153, 956
1928	54, 159	602, 808	1, 948, 094	18, 333, 792	298, 623	2, 125, 289
1929	72, 107	859, 796	1, 689, 927	18, 104, 425	171, 956	1, 304, 457
1930	59, 922	798, 288	851, 514	10, 701, 041	332, 422	2, 745, 024

Year	Humpback or pink		Chum or keta		Steelhead		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	423, 984	$1, 788, 778	255, 495	$942, 525			2, 596, 826	$19, 632, 744
1922	1, 658, 423	7, 189. 494	565, 918	2, 251, 540			4, 501, 652	29, 787, 193
1923	2, 448, 129	11, 899, 956	525, 622	2, 447, 671			5, 035, 697	32, 873, 007
1924	2, 601, 283	12. 837, 346	1, 028, 488	4, 812. 297			5, 294, 915	33, 007, 135
1925	2, 110, 593	11, 137, 102	1, 078, 680	4, 787, 030			4, 459, 937	31, 989, 531
1926	3, 338, 349	17, 987, 527	902, 443	4, 518, 929			6, 652, 882	46, 080, 004
1927	1, 420, 775	8, 338, 690	507, 723	2, 777, 480			3, 572, 128	30, 016, 264
1928	2, 787, 242	18, 285, 530	995, 785	6, 036, 466			6, 083, 903	45, 383, 885
1929	2, 571, 657	15, 579, 356	864, 512	4, 621, 351			5, 370, 159	40, 469, 385
1930	3, 188, 534	13, 288, 421	599, 934	2, 162, 124	152	$974	5, 032, 478	29, 695, 872

NOTE.—Shown in standard cases of forty-eight 1-pound cans.

Pack of canned salmon in the United States and Alaska, 1921 to 1930

Year	Pacific Coast States		Alaska		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	1, 002, 948	$9, 234, 425	2, 596, 826	$19, 632, 744	3, 599, 774	$28, 867, 169
1922	733, 246	8, 633, 524	4. 501, 652	29, 787, 193	5, 234, 898	38, 420. 717
1923	1, 367, 263	12, 660, 566	5, 035, 697	32, 873, 007	6, 402, 960	45, 533, 573
1924	958, 662	9, 394, 467	5, 294, 915	33, 007, 135	6, 253, 577	42, 401, 602
1925	1. 558, 613	15, 379, 976	4, 459, 937	31, 989, 531	6, 018, 550	47, 369, 507
1926	835, 738	10, 139, 302	6, 652, 882	46, 080, 004	7, 488. 620	56, 219, 306
1927	1, 504, 451	15, 712, 497	3. 572, 128	30, 016. 264	5, 076, 579	45, 728, 761
1928	842, 903	9, 254, 258	6, 083, 903	45, 383, 885	6, 926, 806	54, 638, 143
1929	1, 620, 523	15, 616, 312	5, 370, 159	40, 469, 385	6, 990, 682	56, 085, 697
1930	1, 054, 001	13, 140, 081	5, 032, 478	29, 695, 872	6, 086, 479	42, 835, 933

NOTE.—Shown in standard cases of forty-eight 1-pound cans.

SARDINES

In 1930 sardines were packed at 33 plants in Maine and 29 in California. This is a decrease of 4 plants in Maine, 2 in California, and 1 in Massachusetts, as compared with the number operated during the previous year. The production of sardines in Maine amounted to 1,399,212 standard cases of one hundred ¼-pound cans, valued at $4,459,071, which is a decrease of 31 per cent in quantity and 35 per cent in value as compared with the pack in the previous year. In California the production amounted to 2,979,333 standard cases of forty-eight 1-pound cans, valued at $8,741,928, which is a decrease of 22 per cent in quantity and 27 per cent in value. The pack in Maine was considerably below the 10-year average; but that in California, while showing a decrease as compared with the previous year, is considerably over the 10-year average.

Pack of canned sardines, 1930

Sardines (herring)	Maine	
	Cases	*Value*
In olive oil: Quarters, ¼-pound (100 cans)	15, 230	$91, 170
In cottonseed oil: Quarters, ¼-pound (100 cans)	1, 201, 365	3, 856, 546
In mustard:		
Quarters, ¼-pound (100 cans)	65, 915	238, 934
Three-quarters, ¾-pound (48 cans)	81, 043	272, 421
Total	1, 363, 553	4, 459, 071
Total (standard cases)	1, 399, 212	----------

Sardines (pilchard)	California	
	Cases	*Value*
½-pound oval (48 cans):		
In tomato sauce	23, 089	$57, 805
In other sauces and oils	7, 353	23, 801
1-pound oval (48 cans):		
In tomato sauce	2, 340, 062	6, 457, 137
In mustard	127, 058	358, 864
In cottonseed oil	11, 774	30, 292
In natural oil	98, 336	260, 150
In spice	4, 387	13, 345
In other sauces and oils	6, 684	17, 015
¼-pound square (100 cans):		
In olive oil	12, 591	113, 079
In other sauces and oils	690	4, 548
5-ounce tall (100 cans);		
In natural oil	138, 109	402, 891
In other sauces and oils	134	501
1-pound tall (48 cans):		
In tomato sauce	12, 037	29, 467
In natural oil	112, 572	270, 647
In other sauces and oils	2, 876	6, 739
Other sizes, various sauces and oils (standard cases)	151, 371	695, 647
Total	3, 049, 123	8, 741, 928
Total (standard cases)	2, 979, 333	----------

NOTE.—"Standard cases" represent the various sized cases converted to the uniform basis of one-hundred ¼-pound cans to the case of sardines (herring), and forty-eight 1-pound cans to the case of sardines (pilchard).

Pack of canned sardines, 1921 to 1930

Year	Maine and Massachusetts		California	
	Cases	*Value*	*Cases*	*Value*
1921	1, 399, 507	$3, 960, 916	398, 668	$2, 346, 446
1922	1, 869, 719	5, 750, 109	715, 364	3, 361, 480
1923	1, 272, 277	5, 288, 865	1, 100, 162	4, 607, 931
1924	1, 899, 925	7, 191, 026	1, 367, 139	5, 445, 573
1925	1, 870, 786	6, 716, 701	1, 714, 913	6, 380, 617
1926	1, 717, 537	6, 727, 388	2, 093, 278	7, 807, 404
1927	1, 262, 124	5, 249, 030	2, 563, 146	9, 268, 784
1928	[1] 2, 055, 763	8, 076, 546	2, 771, 527	9, 658, 822
1929	2, 025, 801	6, 897, 946	3, 831, 215	11, 996, 997
1930	[1] 1, 399, 212	4, 459, 071	2, 979, 333	8, 741, 928

[1] Maine only. None packed in Massachusetts.

NOTE.—Shown in standard cases of one hundred ¼-pound cans for Maine and Massachusetts and forty-eight 1-pound cans for California.

TUNA AND TUNALIKE FISHES

In 1930 these fishes were canned in 15 plants in California—a decrease of 2 plants as compared with those operating in 1929. The total pack amounted to 2,010,640 standard cases of forty-eight ½-pound cans, valued at $13,055,876. This is an increase of 34 per cent in quantity and 32 per cent in value, as compared with the pack in the previous year. The pack was by far the largest on record.

Pack of canned tuna and tunalike fishes in California, 1930

Sizes	Albacore		Yellowfin [1]		Bluefin		Striped	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound round (48 cans)	[2] 34,815	$250,521	[2] 129,538	$559,492	54,261	$238,138	40,406	$153,060
½-pound round (48 cans)	91,633	694,361	615,776	4,172,891	213,818	1,346,066	197,111	1,088,716
1-pound round (48 cans)	[3] 16,180	212,216	[3] 100,019	1,217,219	[3] 32,674	365,075	21,365	209,506
Flakes (standard cases)	3,032	14,271	99,219	446,307	22,122	97,839	4,067	18,280
Total	145,660	1,171,369	944,552	6,395,909	322,875	2,047,118	262,949	1,469,562
Total (standard cases)	144,433	----------	979,801	----------	328,419	----------	264,111	----------

Sizes	"Tonno" [4]		Bonito		Yellowtail		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound round (48 cans)	[2] 269,262	$1,098,171	[2] 44,786	$156,120	[2] 8,600	$27,504	581,668	$2,483,006
½-pound round (48 cans)	[5] 23,257	181,701	51,950	252,133	15,101	73,771	1,208,646	7,809,639
1-pound round (48 cans)	844	12,984	7,388	61,572	12,826	107,463	191,296	2,186,035
Flakes (standard cases)	--------	----------	128	499	--------	----------	128,568	577,196
Total	293,363	1,292,856	104,252	470,324	36,527	208,738	2,110,178	13,055,876
Total (standard cases)	159,576	----------	89,247	----------	45,053	----------	2,010,640	----------

[1] Includes a small amount of mixed tuna flakes.

[2] Includes the pack in ⅛-pound cans, 96 to the case and ¼-pound cans 100 to the case, which have been converted to the equivalent of ¼-pound round cans, 48 to the case.

[3] Includes the pack in 4-pound cans, 12 to the case, which have been converted to the equivalent of 1-pound round cans, 48 to the case.

[4] Manufactured chiefly from bluefin tuna. All are packed in olive oil and the greater part marketed in square cans.

[5] Includes the pack in ½-pound cans 50 to the case, which have been converted to the equivalent of ½-pound round cans, 48 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight ½-pound cans to the case.

Pack of canned tuna and tunalike fishes, 1921 to 1930

Year	Albacore		Bluefin and yellowfin tuna		Striped tuna		"Tonno"	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	456,152	$2,657,266	64,816	$306,486	27,972	$109,929	----------	----------
1922	296,210	2,304,935	168,874	1,047,621	177,995	942,356	13,714	$139,067
1923	310,037	3,106,329	261,773	1,959,812	96,452	578,254	124,416	1,136,814
1924	416,820	4,024,509	65,941	455,048	43,159	239,198	97,304	861,861
1925	[1] 518,079	4,412,655	261,482	1,745,338	168,177	997,697	131,159	1,212,024
1926 [2]	61,197	471,502	287,699	1,718,744	290,278	1,525,146	137,720	1,209,041
1927	131,157	1,118,985	533,691	3,594,195	414,314	2,362,587	116,335	979,860
1928	105,722	1,027,289	[3] 743,536	4,976,855	201,816	1,098,822	126,959	1,068,299
1929	148,496	1,478,057	[3] 794,893	5,007,823	386,374	2,106,767	118,125	992,120
1930	144,433	1,171,369	1,308,220	8,443,027	264,111	1,469,562	159,576	1,292,856

Year	Bonito		Yellowtail		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	----------	----------	210	$945	549,150	$3,074,626
1922	10,810	$58,900	4,718	18,994	672,321	4,511,873
1923	15,099	77,906	10,059	55,645	817,836	6,914,760
1924	12,899	94,806	16,293	81,164	652,416	5,756,586
1925	10,090	61,207	13,484	70,159	1,102,471	8,499,080
1926 [2]	48,113	259,204	26,192	98,646	851,199	5,282,283
1927	18,587	111,253	41,734	201,347	1,255,818	8,368,227
1928	24,112	123,242	14,077	79,523	1,216,222	8,374,030
1929	34,789	186,650	23,170	102,036	1,504,306	9,873,453
1930	89,247	470,324	45,053	208,738	2,010,640	13,055,876

[1] Includes 27,489 cases of tuna flakes, valued at $120,637.

[2] Includes 25,353 cases of tuna flakes, valued at $102,129, which have been credited to the various species as packed.

[3] Includes a few cases of mixed tuna of other varieties.

NOTE.—Shown in standard cases of forty-eight ½-pound cans.

ALEWIFE PRODUCTS

In 1930 alewives or alewife roe were canned at 9 plants in Maryland, 23 in Virginia, and 2 in North Carolina—a total of 34 plants, or 2 more than in 1929. The output consisted of 73,117 standard cases of canned alewives, valued at $223,065, and 60,367 cases of alewife roe, valued at $303,559—a total of 133,484 standard cases of forty-eight 1-pound cans, valued at $526,624. Considering the total production, there was an increase of 37 per cent in quantity and 21 per cent in value as compared with the pack in the previous year. The pack in 1930 was considerably greater than that of any year for which there is record.

Pack of canned alewives and alewife roe, 1930

STANDARD CASES

Products	Maryland		Virginia and North Carolina		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Alewives	38, 493	$117, 581	34, 624	$105, 484	73, 117	$223, 065
Alewife roe	14, 553	80, 480	45, 814	223, 079	60, 367	303, 559
Total	53, 046	198, 061	80, 438	328, 563	133, 484	526, 624

ACTUAL CASES

Products and sizes	Cases	Value
Alewives:		
15 and 16-ounce (48 cans)	60, 585	$185, 771
17-ounce (24 cans)	9, 269	14, 688
Other sizes (standard cases)	8, 879	22, 606
Total	78, 733	223, 065
Alewife roe:		
7½, 8 and 8½ ounce (48 cans)	12, 570	43, 186
15 and 16 ounce (24 cans)	8, 367	22, 341
17-ounce (24 cans)	75, 257	187, 579
19-ounce (24 cans)	8, 640	24, 593
Other sizes (standard cases)	4, 746	25, 860
Total	109, 580	303, 559
Grand total	188, 313	526, 624

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case.

Pack of canned alewives and alewife roe, 1921 to 1930

Year	Alewives		Alewife roe		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	156	$813	20, 304	$157, 841	20, 460	$158, 654
1922	489	1, 994	18, 099	137, 514	18, 588	139, 508
1923	537	1, 915	20, 404	169, 435	20, 941	171, 350
1924	1, 550	5, 118	41, 642	332, 245	43, 192	337, 363
1925	4, 449	15, 045	35, 183	240, 461	39, 632	255, 506
1926	19, 920	65, 405	33, 886	201, 278	53, 806	266, 683
1927	21, 327	64, 577	45, 168	252, 120	66, 495	316, 697
1928	50, 674	150, 878	56, 392	288, 592	107, 066	439, 470
1929	68, 445	246, 773	28, 819	188, 374	97, 264	435, 147
1930	73, 117	223, 065	60, 367	303, 559	133, 484	526, 624

NOTE.—Shown in standard cases of forty-eight 1-pound cans.

SHRIMP

In 1930 shrimp were canned at 1 plant in North Carolina, 4 in South Carolina, 6 in Georgia, 9 in Florida, 4 in Alabama, 15 in Mississippi, 25 in Louisiana, and 5 in Texas, making a total of 69 plants, or 7 less than in 1929. The total pack amounted to 818,491 standard cases of forty-eight No. 1 cans (5-ounce cans, dry pack, and 5¾-ounce, wet pack), valued at $4,960,542. This is a decrease of 10 per cent both in quantity and value of the pack as compared with that of the previous year. Louisiana was by far the most important State in the production of canned shrimp, accounting for 49 per cent of the pack.

Pack of canned shrimp, 1930

STANDARD CASES

States	Dry pack (in tins)		Wet pack (in tins)		Wet pack (in glass)[1]		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
North and South Carolina	5,620	$30,174	41,722	$215,342			47,342	$245,516
Georgia	20,901	121,656	50,320	274,371			71,221	396,027
Florida and Alabama	39,829	220,338	48,716	248,619	24,769	$269,042	113,314	737,999
Mississippi	45,904	268,290	60,546	328,594			106,450	596,884
Louisiana	161,474	1,035,649	237,881	1,342,683			399,355	2,378,332
Texas	9,151	55,426	45,788	276,828	12,092	131,370	67,031	463,624
South Carolina, Georgia, Mississippi, and Louisiana					13,778	142,160	13,778	142,160
Total	282,879	1,731,533	484,973	2,686,437	50,639	542,572	818,491	4,960,542

ACTUAL CASES

Sizes	Cases	Value
In tins, dry:		
No. 1, 4-ounce (48 cans)	7,122	$31,177
No. 1, 4½-ounce (48 cans)	3,306	19,436
No. 1, 5-ounce (48 cans)	251,728	1,525,113
No. 1½, 8¼-ounce (24 cans)	26,750	152,986
Other sizes (standard cases)	410	2,821
In tins, wet:		
No. 1, 5¾-ounce (48 cans)	476,020	2,629,836
No. 1½, 9¾-ounce (24 cans)	3,679	20,137
Other sizes (standard cases)	5,834	36,464
In glass, wet:		
5¼-ounce (24 cans)	103,122	506,739
6¼-ounce (24 cans)	4,837	24,583
Other sizes (standard cases)	1,125	11,250
Total		4,960,542

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[1] The pack of shrimp in glass for South Carolina, Georgia, Mississippi, and Louisiana has been grouped to avoid the disclosure of private enterprise.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 No. 1, 5-ounce cans to the case in the dry pack and 48 No. 1, 5¾-ounce cans to the case in the wet pack.

Pack of canned shrimp, 1921 to 1930

Year	Cases	Value	Year	Cases	Value
1921	655,364	$3,804,781	1926	732,365	$4,122,092
1922	579,797	3,064,087	1927	852,764	5,321,652
1923	700,429	4,381,534	1928	851,831	5,181,547
1924	718,517	4,608,950	1929	909,949	5,528,792
1925	735,714	3,782,819	1930	818,491	4,960,542

NOTE.—Shown in standard cases of 48 No. 1 cans.

OYSTERS

In 1930 oysters were canned at 2 plants in Maryland, 3 in North Carolina, 10 in South Carolina, 3 in Georgia, 2 in Florida, 2 in Alabama, 18 in Mississippi, 7 in Louisiana, and 1 in Texas—a total of 48 plants, or 13 less than in 1929. The output of the plants amounted to 396,174 standard cases of forty-eight 5-ounce cans valued at $1,836,862. This is a decrease of 24 per cent in quantity and 33 per cent in value as compared with the pack and its value for the previous year. The pack in 1930 was less than that in any year since 1921. The production in Mississippi accounted for 57 per cent of the total.

The pack during the spring period (January to May, 1930) amounted to 333, 174 standard cases, valued at $1,605,647, and that during the fall period (September to December, 1930) amounted to 63,000 standard cases, valued at $231,215. The pack during the spring period of 1929 amounted to 405,004 standard cases, valued at $2,131,138, and that during the fall period of 1929, 114,141 standard cases, valued at $601,340.

Pack of canned oysters, 1930

STANDARD CASES

States	Cases	Value	States	Cases	Value
Maryland and North Carolina	26, 352	$145, 201	Mississippi	224, 921	$1, 034, 362
South Carolina	89, 562	391, 459	Louisiana and Texas	43, 258	214, 705
Georgia	4, 293	19, 747			
Florida and Alabama	7, 788	31, 388	Total	396, 174	1, 836, 862

ACTUAL CASES

Sizes	Cases	Value
4-ounce (48 cans)	52, 592	$225, 284
5-ounce (48 cans)	272, 174	1, 214, 653
8-ounce (24 cans)	26, 679	112, 773
10-ounce (24 cans)	55, 981	248, 075
Other sizes (standard cases)	4, 602	36, 077
Total		1, 836, 862

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 No. 1, 5-ounce cans to the case.

Pack of canned oysters, 1921 to 1930

Year	Cases	Value	Year	Cases	Value
1921	442, 086	$2, 179, 271	1926	413, 834	$2, 026, 569
1922	505, 973	2, 423, 616	1927	447, 297	2, 367, 949
1923	524, 544	2, 720, 073	1928	503, 952	2, 760, 576
1924	447, 481	2, 478, 044	1929	519, 145	2, 732, 478
1925	654, 755	3, 721, 159	1930	396, 174	1, 836, 862

NOTE.—Shown in standard cases of 48 No. 1 5-ounce cans to the case.

CLAM PRODUCTS

In 1930 razor clam products were canned at 15 plants in Washington, 5 in Oregon, and 6 in Alaska; hard clam products at 1 plant in Rhode Island, 2 in New York, 1 in New Jersey, 1 in Georgia, 1 in Florida, and 5 in Washington; and soft clam products at 24 plants in Maine and 2 in Massachusetts—a total of 62 plants, or 1 less than a year ago. The total production amounted to 558,884 standard cases of 48 No. 1 cans, valued at $2,666,045, an increase of 1 per cent in quantity and 5 per cent in value as compared with that in 1929. Considered according to varieties of clams, the pack of razor clam products amounted to 75,671 standard cases, valued at $677,754; hard clams, 298,798 standard cases, valued at $1,299,189; and soft clam products, 184,415 standard cases, valued at $689,102. The total value of the pack in 1930 exceeds that of any year since 1921, with the exception of the pack in 1927.

Pack of canned clams and clam products, 1930

Items and States	Cases	Value
Razor clams (Washington, Oregon, and Alaska):		
Whole—		
No. 1, 5-ounce (48 cans)	4, 381	$44, 651
1-pound, 8-ounce (48 cans)	1, 451	14, 394
Other sizes (standard cases)	229	2, 046
Minced—		
½ pound flat, 4-ounce (48 cans)	45, 574	329, 372
No. 1, 5-ounce (48 cans)	30, 064	274, 499
No. 2, 10-ounce (24 cans)	991	8, 721
Other sizes (standard cases)	12	162
Juice and chowder—		
No. 2, 20-ounce (24 cans)	515	2, 112
Other sizes (standard cases)	691	1, 797
Total	83, 908	677, 754
Total (standard cases)	75, 671	
Hard clams (Rhode Island, New York, New Jersey, Georgia, Florida, and Washington):		
Whole—		
No. 1, 5-ounce (48 cans)	5, 289	43, 780
1-pound, 8-ounce (48 cans)	2, 260	15, 820
No. 2, 10-ounce (24 cans)	10, 642	63, 375
No. 10, 52-ounce (6 cans)	5, 804	33, 609
Other sizes (standard cases)	1, 169	6, 573
Minced—		
No. 1, 5-ounce (48 cans)	409	2, 456
Other sizes (standard cases)	4, 067	27, 127
Chowder—		
No. 1, 10-ounce (48 cans)	166, 541	671, 938
No. 3, 33-ounce (24 cans)	21, 547	131, 197
Other sizes (standard cases)	51, 382	206, 146
Juice—		
No. 1, 10-ounce (48 cans)	1, 225	9, 156
No. 10, 102-ounce (6 cans)	1, 482	4, 486
Other sizes (standard cases)	4, 259	38, 719
Broth and cocktail—		
Various sizes (standard cases)	5, 228	44, 807
Total	281, 304	1, 299, 189
Total (standard cases)	298, 798	
Soft clams (Maine and Massachusetts):		
Whole—		
No. 1, 5-ounce (48 cans)	50, 507	228, 628
1-pound, 8-ounce (48 cans)	8, 075	55, 247
No. 2, 10-ounce (24 cans)	9, 592	43, 178
Other sizes (standard cases)	3, 999	13, 982
Chowder—		
No. 1, 10-ounce (48 cans)	37, 445	121, 681
No. 3, 33-ounce (24 cans)	18, 180	75, 892
Other sizes (standard cases)	4, 796	14, 437
Bouillon and juice—		
7-ounce (48 cans)	990	6, 420
10-ounce (48 cans)	14, 988	53, 987
20-ounce (24 cans)	4, 507	8, 196
102-ounce (6 cans)	3, 192	10, 929
Other sizes (standard cases)	10, 905	56, 525
Total	167, 176	689, 102
Total (standard cases)	184, 415	
Grand total (standard cases)	558, 884	2, 666, 045

NOTE.—"Standard cases" represent the various-sized cases converted to the equivalent of 48 No. 1, 5-ounce, cans to the case, for whole and minced clams; and 48 No. 1, 10-ounce, cans to the case, for other clam products.

Value of canned clams and clam products, 1921 to 1930

Year	Razor clams	Hard clams	Soft clams	Clam chowders, juices, etc.	Total
1921	$506, 591	$138, 699	$338, 775	$182, 442	$1, 166, 507
1922	876, 364	201, 270	327, 287	311, 444	1, 716, 365
1923	883, 535	194, 937	308, 560	323, 584	1, 710, 616
1924	863, 126	271, 911	459, 882	566, 470	2, 161, 389
1925	860, 002	218, 601	287, 073	484, 702	1, 850, 378
1926	795, 256	191, 044	279, 996	738, 354	2, 004, 650
1927	1, 046, 797	231, 526	270, 747	1, 195, 884	2, 744, 954
1928	936, 394	203, 959	318, 510	1, 164, 735	2, 623, 598
1929	614, 130	259, 435	321, 386	1, 353, 521	2, 548, 472
1930	673, 845	192, 740	341, 035	1, 458, 425	2, 666, 045

MISCELLANEOUS CANNED FISHERY PRODUCTS

In addition to those products discussed individually above, there were 384,489 standard cases of forty-eight 1-pound cans of miscellaneous canned fishery products, valued at $3,775,360. Among these products shad were canned at 14 plants, shad roe at 10 plants, mackerel at 15 plants, fish flakes at 6 plants, fish cakes, balls, etc., at 9 plants, miscellaneous fish at 16 plants, salmon eggs (for bait) at 7 plants, sturgeon caviar at 7 plants, whitefish roe and caviar at 5 plants, miscellaneous roe and caviar at 6 plants, crabs at 4 plants, and miscellaneous shellfish at 8 plants.

Compared with the pack of a year ago, the pack of shad and shad roe, which amounted to 15,584 cases, valued at $111,769, decreased 46 per cent in quantity and 48 per cent in value. The pack of mackerel, which amounted to 109,322 standard cases, valued at $396,027, decreased 82 per cent in quantity and 84 per cent in value. The pack of fish flakes, which amounted to 62,322 cases, valued at $617,203, increased 11 per cent in quantity and 8 per cent in value. The pack of fish cakes, balls, etc., amounted to 122,281 cases, valued at $1,003,501, which is a decrease of 7 per cent in quantity and 8 per cent in value. The pack of miscellaneous canned fish amounted to 23,369 cases, valued at $117,900, which is a decrease of 16 per cent in quantity and 17 per cent in value. The pack of salmon eggs (for bait) amounted to 3,613 cases, valued at $96,381, which is a decrease of 17 per cent in quantity and 12 per cent in value. The pack of sturgeon caviar amounted to 7,993 cases, valued at $1,007,345; that of whitefish roe and caviar 866 cases, valued at $25,599; and that of miscellaneous roe and caviar 16,300 cases, valued at $117,161. Comparable statistics covering this group for the previous year are not available, since data on roe and caviar imported and canned in the United States were not included during the previous years. The pack of crabs amounted to 1,545 cases, valued at $56,370—an increase of 34 per cent in quantity and 85 per cent in value. The pack of miscellaneous shellfish amounted to 21,294 cases, valued at $226,104, which is an increase of 55 per cent in quantity and 23 per cent in value.

Pack of miscellaneous canned fishery products in the United States and Alaska, 1930

Items	Cases	Value	Items	Cases	Value
Shad	12, 245	$42, 190	Sturgeon caviar [2]	7, 993	$1, 007, 345
Shad roe	3, 339	69, 579	Whitefish roe and caviar	866	25, 599
Mackerel	109, 322	396, 027	Miscellaneous roe and caviar [3]	16, 300	117, 161
Fish flakes	62, 322	617, 203	Crabs	1, 545	56, 370
Fish cakes, balls, etc.	122, 281	1, 003, 501	Miscellaneous shellfish [4]	21, 294	226, 104
Miscellaneous fish [1]	23, 369	117, 900			
Salmon eggs (for bait)	3, 613	96, 381	Total	384, 489	3, 775, 360

[1] Includes canned fillets, finnan haddie, fish chowder, cat and dog food, bait herring, eels, etc.
[2] Produced principally from imported sturgeon.
[3] Includes canned salmon eggs (for food) and fish roe from various species of ground fish, etc.
[4] Includes canned turtle products, terrapin products, mussels, abalone, squid, etc.

Note.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case.

Pack of canned mackerel, 1928 to 1930

Year	Massachusetts		California		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1928	10, 382	$92, 425	388, 521	$1, 621, 595	398, 903	$1, 714, 020
1929	9, 832	87, 684	592, 451	2, 428, 058	602, 283	2, 515, 742
1930	(1)	(1)	[1] 109, 322	[1] 396, 027	109, 322	396, 027

[1] The packs of two plants in Massachusetts are included with California.

NOTE.—Shown in standard cases of forty-eight 1-pound cans to the case.

Pack of canned shad and shad roe, 1921 to 1930

Year	Shad		Shad roe		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
1921	641	$2, 455	38	$142	679	$2, 597
1922	1, 781	9, 961	292	8, 517	2, 073	18, 478
1923	2, 162	37, 165	536	16, 288	2, 698	53, 453
1924	6, 470	20, 461	1, 164	72, 932	7, 634	93, 393
1925	12, 569	53, 875	2, 430	100, 571	14, 999	154, 446
1926	14, 275	63, 334	1, 121	39, 422	15, 396	102, 756
1927	11, 569	61, 842	767	21, 890	12, 336	83, 732
1928	23, 447	110, 006	4, 130	123, 840	27, 577	233, 846
1929	26, 153	122, 117	2, 732	91, 379	28, 885	213, 496
1930	12, 245	42, 190	3, 339	69, 579	15, 584	111, 769

NOTE.—Shown in standard cases of forty-eight 1-pound cans.

Value of canned crabs 1921 to 1930

Year	Value	Year	Value
1921	$115, 800	1926	$25, 222
1922	104, 171	1927	26, 988
1923	47, 023	1928	44, 536
1924	35, 944	1929	30, 530
1925	52, 499	1930	56, 370

BY-PRODUCTS

In 1930 the total value of by-products, including the products of the menhaden, whaling, fresh-water mussel-shell, and marine pearl-shell industries, amounted to $23,720,778. This is a decrease of less than one-half of 1 per cent as compared with the production of these products in 1929. However, statistics on the marine pearl-shell products, which amounted to $4,544,147 in 1930, were not obtained in 1929. Excluding these products, there was a decrease of 19 per cent as compared with the production in 1929. The scrap and meal group was the most valuable and accounted for 25 per cent of the total value of fishery by-products. Fresh-water mussel-shell products followed, with 21 per cent. The other groups in order were marine pearl-shell products, accounting for 19 per cent; marine animal oils, 18 per cent; oyster-shell products, 11 per cent; and miscellaneous by-products, which included fish glue, herring skins and scales, shark skins, fins, and meat, agar, pickled whale meat, whalebone, and isinglass, accounted for 6 per cent.

OILS

In 1930 the production of marine animal oils amounted to 14,704,784 gallons, valued at $4,200,064, which is a decrease of 4 per cent in quantity and 38 per cent in value, as compared with the production of the preceding year. Of the total production, 39 per cent consisted of pilchard or sardine oil; 25 per cent, herring oil (from Maine and Alaska herring and alewives); 22 per cent, menhaden oil; 10 per cent, whale and sperm oil; and 4 per cent, other marine-animal oils, which include that from cod and cod livers, salmon, shark, tuna, mackerel, and miscellaneous fish cuttings and waste.

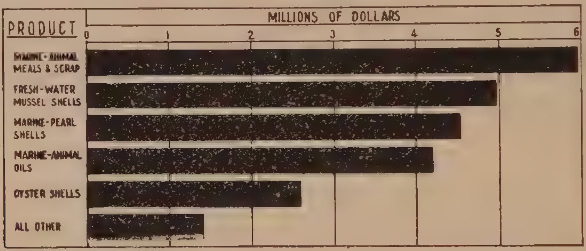

FIGURE 10.—Value of fishery by-products in the United States and Alaska, 1930

SCRAP, MEAL, ETC.

In 1930 the production of marine-animal scrap, meal, etc., amounted to 126,605 tons, valued at $5,976,669. This is a decrease of 11 per cent in quantity and 12 per cent in value as compared with the production in 1929. Of the total production, 26 per cent consisted of dried menhaden scrap and meal, 12 per cent acidulated menhaden scrap and meal, 2 per cent shrimp meal, 57 per cent miscellaneous dried scrap and meal (other than menhaden), and 3 per cent miscellaneous crude or green scrap. The largest item in the miscellaneous dried scrap and meal group was pilchard meal, amounting to 25,938 tons, valued at $1,414,858.

Production of miscellaneous by-products, 1930

Products	Alantic and Gulf coasts		Pacific coast (including Alaska)		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Dried scrap:						
Alewife.....tons..	1,010	$46,254	-----	-----	1,010	$46,254
Herring (Maine).....do....	769	26,545	-----	-----	769	26,545
Ground fish.....do....	193	9,316	-----	-----	193	9,316
Crab, blue and king.....do....	2,899	64,540	-----	-----	2,899	64,540
Miscellaneous.....do....	120	2,680	180	$7,521	300	10,201
Meal:						
Herring (Alaska).....do....	-----	-----	11,706	655,050	11,706	655,050
Herring (Maine).....do....	2,229	83.142	-----	-----	2,229	83,142
Pilchard.....do....	-----	-----	25,938	1,414,858	25,938	1,414,858
Salmon.....do....	-----	-----	2,473	133,681	2,473	133,681
Tuna.....do....	-----	-----	8,554	428,556	8,554	428,556
Whale meat and bone.....do....	-----	-----	1,170	51,400	1,170	51,400
Ground fish.....do....	11,451	701,042	-----	-----	11,451	701,042
Shrimp.....do....	[1] 2,402	[1] 69,345	(1)	(1)	2,402	69,345
Miscellaneous.....do....	348	19,135	3,658	233,397	4,006	252,532
Pomace, herring (Maine).....do....	3,362	5,441	-----	-----	3,362	5,441
Oil:						
Alewife.....gallons..	33,689	7,093	-----	-----	33,689	7,093
Cod and cod liver.....do....	152,451	116,173	-----	-----	152,451	116,173
Herring (Alaska).....do....	-----	-----	3,545,422	876,013	3,545,422	876,013
Herring (Maine).....do....	117,742	29,721	-----	-----	117,742	29,721
Pilchard.....do....	-----	-----	5,803,166	1,826,319	5,803,166	1,826,319
Salmon.....do....	-----	-----	233,941	53,778	233,941	53,778
Shark.....do....	[2] 4,336	[2] 1,764	(2)	(2)	4,336	1,764
Sperm.....do....	-----	-----	128,027	48,009	128,027	48,009
Tanners.....do....	40,618	19,137	-----	-----	40,618	19,137
Tuna.....do....	-----	-----	56,748	14,153	56,748	14,153
Whale.....do....	-----	-----	1,325,229	536,904	1,325,229	536,904
Miscellaneous.....do....	8,523	2,557	63,627	19,489	72,150	22,046
Liquid glue.....do....	[3] 526,332	[3] 1,242,214	(3)	(3)	526,332	1,242,214
Miscellaneous by-products [4] .pounds..	638,312	85,469	94,435	69,544	732,747	155,013
Total.....	-----	2,531,568	-----	6,368,672	-----	8,900,240

[1] A small quantity of shrimp meal produced in California is included with the production of the Atlantic and Gulf coasts.

[2] A small quantity of shark oil produced in California is included with the production of the Atlantic and Gulf coasts.

[3] A small quantity of liquid glue produced by the firm in California is included with the production of the Atlantic and Gulf coasts.

[4] Includes herring skins and scales, shark skins, fins and meat, agar, pickled whale meat, whalebone and isinglass.

NOTE.—The oils produced on the Pacific coast are reported in trade gallons (7½ pounds) and those produced on the Atlantic and Gulf coasts are reported in United States gallons (about 7.74 pounds).

Production of marine-animal oils, 1921 to 1930

Year	Menhaden		Herring		Pilchard or sardine	
	Gallons	*Value*	*Gallons*	*Value*	*Gallons*	*Value*
1921.....	6,260,478	$1,719,892	112,838	$26,735	170,977	$35,760
1922.....	7,102,677	2,904,833	450,362	150,144	428,859	145,668
1923.....	7,461,365	3,316,277	945,424	384,053	966,247	424,103
1924.....	3,923,904	1,817,626	1,324,002	571,399	2,338,711	1,076,903
1925.....	6,023,108	3,001,106	2,442,527	1,034,071	3,120,048	1,568,753
1926.....	3,942,821	1,729,160	3,116,936	1,382,763	2,113,028	932,651
1927.....	3,957,068	1,716,474	2,291,687	960,250	2,514,562	1,116,725
1928.....	3,585,569	1,455,376	2,743,065	1,085,799	3,825,786	1,621,531
1929.....	3,172,735	1,381,816	3,510,666	1,469,120	6,427,404	2,815,954
1930.....	3,191,265	648,954	3,696,853	912,827	5,803,166	1,826,319

Year	Whale and sperm		Other Marine animal oils		Total	
	Gallons	*Value*	*Gallons*	*Value*	*Gallons*	*Value*
1921.....	[1] 168,729	$94,767	[1] 733,259	$201,516	7,446,281	$2,078,670
1922.....	2,247,145	884,714	306,430	145,401	10,535,473	4,230,760
1923.....	1,556,830	791,884	443,935	187,877	11,373,801	5,104,194
1924.....	1,242,836	661,271	381,832	184,534	9,211,285	4,311,733
1925.....	1,221,198	685,011	480,195	211,250	13,287,076	6,500,191
1926.....	1,276,009	748,075	439,252	234,832	10,888,046	5,027,491
1927.....	1,531,400	755,965	579,396	355,607	10,874,113	4,905,021
1928.....	1,458,248	676,534	532,909	310,378	12,145,577	5,149,618
1929.....	1,525,657	796,302	716,595	338,427	15,353,057	6,801,619
1930.....	1,453,256	584,913	560,244	227,051	14,704,784	4,200,064

Whale oil included with "Other fish oils" in 1921.

Production of marine-animal meal and scrap, 1921 to 1930

Year	Dried menhaden scrap and meal		Acidulated menhaden scrap		Shrimp meal	
	Tons	*Value*	*Tons*	*Value*	*Tons*	*Value*
1921	37,858	$1,380,455	44,804	$905,640	628	$16,814
1922	67,821	2,665,441	25,755	556,317	562	15,398
1923	43,452	2,029,406	44,935	1,064,870	1,269	48,290
1924	21,008	996,866	24,409	495,684	936	31,580
1925	30,167	1,519,458	41,463	1,102,051	1,079	31,658
1926	24,226	1,164,396	23,553	548,204	1,036	33,775
1927	26,417	1,406,915	19,984	566,590	1,427	44,716
1928	24,681	1,453,651	20,028	531,238	1,726	58,080
1929	33,041	1,625,694	23,089	622,544	2,153	73,429
1930	32,418	1,629,471	15,725	395,295	2,402	69,345

Year	Crude or green scrap		Other dried scrap and meal		Total	
	Tons	*Value*	*Tons*	*Value*	*Tons*	*Value*
1921	1,810	$21,327	22,173	$1,232,906	107,273	$3,557,142
1922	390	9,175	21,638	1,090,356	116,166	4,336,677
1923	1,593	13,721	22,636	1,257,098	113,885	4,413,385
1924	4,097	15,217	30,847	1,373,351	81,297	2,912,698
1925	5,787	16,430	39,566	1,981,038	118,062	4,650,635
1926	6,456	12,692	37,703	1,892,010	92,974	3,651,077
1927	1,960	8,942	42,078	2,293,919	91,866	4,321,082
1928	3,067	20,290	55,017	3,318,884	104,519	5,382,143
1929	4,540	41,519	79,858	4,438,176	142,681	6,801,362
1930	3,362	5,441	72,698	3,877,117	126,605	5,976,669

GLUE

In 1930 the production of liquid glue amounted to 526,332 gallons, valued at $1,242,214. This is a decrease of 3 per cent in quantity and 4 per cent in value as compared with the production of the previous year.

Production of fish glue, 1921 to 1930

Year	Gallons	Value	Year	Gallons	Value
1921	347,048	$364,415	1926	520,622	$732,109
1922	323,003	278,424	1927	512,136	860,396
1923	465,814	680,054	1928	510,587	1,254,082
1924	502,940	550,391	1929	539,937	1,298,096
1925	510,816	589,064	1930	526,332	1,242,214

OYSTER-SHELL PRODUCTS

In 1930 oyster-shell products were manufactured at 2 plants in Rhode Island, 1 in Connecticut, 3 in Pennsylvania, 5 in New Jersey, 8 in Maryland, 7 in Virginia, 3 in North Carolina, 5 in South Carolina, 2 in Florida, 2 in Alabama, 6 in Mississippi, 4 in Louisiana, 1 in Texas, and 1 in California—a total of 50 plants, which is the same number as operated during 1929. These plants produced 279,118 tons of crushed oyster shell for poultry feed, valued at $2,309,544, and 67,938 tons of oyster-shell lime, valued at $285,708—a total of 347,056 tons, valued at $2,595,252. Compared with the total production of these products in 1929, there was an increase of 4 per cent in quantity and 3 per cent in value. The production in Louisiana accounted for 36 per cent of the total quantity and 40 per cent of the total value. The production of crushed oyster-shell products was greater in 1930 than in any year since 1921.

Production of oyster-shell products, 1930

States	Crushed oyster shell for poultry feed		Oyster-shell lime		Total	
	Tons	*Value*	*Tons*	*Value*	*Tons*	*Value*
Rhode Island and Connecticut	677	$8, 103	133	$651	810	$8, 754
Pennsylvania	5, 738	61, 091	1, 752	8, 629	7, 490	69, 720
New Jersey	7, 025	67, 151	1, 819	8, 604	8, 844	75, 755
Maryland	40, 706	312, 847	20, 080	53, 722	60, 786	366, 569
Virginia	18, 519	166, 444	[1] 20, 645	151, 476	39, 164	317, 920
North Carolina and South Carolina	14, 590	116, 890	2, 675	14, 650	17, 265	131, 540
Florida and California	29, 033	242, 601	2, 892	13, 085	31, 925	255, 686
Alabama and Texas	7, 287	51, 009	835	768	8, 122	51, 777
Mississippi	38, 663	270, 641	7, 733	5, 126	46, 396	275, 767
Louisiana	116, 880	1, 012, 767	9, 374	28, 997	126, 254	1, 041, 764
Total	279, 118	2, 309, 544	67, 938	285, 708	347, 056	2, 595, 252

[1] Of this amount, 9,150 tons, valued at $85,920, were reported as "burned" lime.

Production of oyster-shell products, 1921 to 1930

Year	Crushed oyster shell for poultry feed		Oyster-shell lime		Total
	Tons	*Value*	*Tons*	*Value*	*Value*
1921	185, 474	$1, 759, 120	73, 764	$502, 634	$2, 261, 754
1922	236, 021	2, 005, 838	93, 168	431, 213	2, 437, 051
1923	224, 983	1, 986, 249	83, 808	372, 286	2, 358, 535
1924	219, 211	2, 019, 254	70, 269	336, 384	2, 355, 638
1925	226, 971	2, 075, 057	67, 818	303, 261	2, 378, 318
1926	251, 166	2, 379, 141	57, 232	207, 019	2, 586, 160
1927	249, 959	2, 332, 065	60, 560	268, 985	2, 601, 050
1928	237, 305	2, 155, 985	68, 708	303, 439	2, 459, 424
1929	262, 232	2, 223, 853	72, 534	300, 646	2, 524, 499
1930	279, 118	2, 309, 544	67, 938	285, 708	2, 595, 252

FRESH-WATER MUSSEL-SHELL PRODUCTS

In 1930 products manufactured from fresh-water mussel shells were valued at $5,007,419, which is a decrease of 19 per cent as compared with the value of the production in 1929. Of the total production, 96 per cent of the value consisted of pearl buttons. The remaining products included crushed shell for poultry feed, lime, cut shells, stucco, colored and natural color shells, and shell chips used for decorative purposes and "pearl novelties." The total production of finished pearl buttons from fresh-water mussel shells amounted to 15,433,944 gross, valued at $4,785,881. The products from the fresh-water mussel-shell industry which were manufactured in Iowa accounted for 71 per cent of the total.

Mussel shells utilized in the above production amounted to 59,490,000 pounds, valued at $1,092,156. Shells were taken in 17 States in the Mississippi Valley and Great Lakes region. The larger producing States were Arkansas, with 31 per cent of the total shells; Illinois, 14 per cent; Tennessee, 13 per cent; Indiana, 9 per cent; Michigan, 8 per cent; and Iowa, 6 per cent.

Production of fresh-water mussel-shell products, 1930

Items	Iowa		Other States		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Pearl buttons..........gross..	11,299,215	$3,340,933	4,134,729	$1,444,948	15,433,944	$4,785,881
Crushed shell for poultry feed ....tons..	8,349	71,803	344	1,758	8,693	73,561
Lime..................do...	1,252	1,914	261	563	1,513	2,477
Other products [1].............	....	[2] 145,500	....	(2)	....	145,500
Total..................	....	3,560,150	....	1,447,269	....	5,007,419

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[1] Includes cut shells, stucco, colored and natural color shells and shell chips used for decorative purposes and "pearl novelties."

[2] A small production made in other States has been included with Iowa.

MARINE PEARL-SHELL PRODUCTS

In 1930 statistics on the marine pearl-shell industry were obtained for the first time in connection with the canned fishery products and by-products survey. The value of the products of this industry amounted to $4,544,147. Of this value, pearl buttons alone accounted for 81 per cent, the remaining 19 per cent consisting of novelties, such as buckles, knife and revolver handles, inlays for jewelry, ornaments, etc. Of the total production, New Jersey accounted for 33 per cent of the value and New York 17 per cent. The total production of finished pearl buttons from marine pearl shells amounted to 4,484,393 gross, valued at $3,699,313.

Marine pearl-shell products were manufactured at 1 plant in Maine, 2 in Massachusetts, 3 in Rhode Island, 4 in Connecticut, 12 in New York, 18 in New Jersey, 2 in Pennsylvania, 1 in Delaware, 1 in Maryland, 1 in Florida, and 4 in California.

Production of marine pearl-shell products,[1] 1930

Items	Maine, Massachusetts, Rhode Island, and Connecticut		New York		New Jersey	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons..................	1,413,803	$1,052,584	748,718	$626,874	903,265	$1,148,665
Novelties [2]..................	....	151,804	....	134,684	....	343,244
Total..................	....	1,204,388	....	761,558	....	1,491,909

Items	Delaware, Pennsylvania, Maryland, Florida, and California		Total	
	Gross	*Value*	*Gross*	*Value*
Pearl buttons..................................	1,418,607	$871,190	4,484,393	$3,699,313
Novelties [2]..................................	....	215,102	....	844,834
Total..................................	....	1,086,292	....	4,544,147

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[1] Produced principally from imported shells.

[2] Includes buckles, knife handles, revolver handles, inlays for jewelry, ornaments, etc.

MENHADEN INDUSTRY

In 1930, 1 menhaden factory was operated in Connecticut, 2 in New Jersey, 2 in Delaware, 10 in Virginia, 11 in North Carolina, 1 in South Carolina, 1 in Georgia, and 5 in Florida—a total of 33 factories, or 4 less than in 1929. These plants utilized 611,213,000 fish in the manufacture of 22,666 tons of dry scrap, valued at $1,084,754; 9,752 tons of fish meal, valued at $544,717; 15,725 tons of acidulated scrap, valued at $395,295; and 3,191,265 gallons of oil, valued at $648,954, making a total value for menhaden products of $2,673,720. This is a decrease of 26 per cent as compared with the value in the previous year. The value of the production in Virginia accounted for 39 per cent of the total.

Fish utilized and products of the menhaden industry, 1930

States	Menhaden utilized	Products						
		Dry scrap and meal		Acidulated scrap		Oil		Total
	Number	*Tons*	*Value*	*Tons*	*Value*	*Gallons*	*Value*	*Value*
Connecticut, New Jersey, and Delaware	73,293,000	1,768	$89,288	3,858	$103,138	685,699	$142,966	$335,392
Virginia	192,714,000	14,325	698,442	--------	--------	1,592,733	338,377	1,036,819
North Carolina	89,133,000	4,351	210,058	3,379	83,414	308,472	51,877	345,349
South Carolina, Florida, and Georgia	256,073,000	11,974	631,683	8,488	208,743	604,361	115,734	956,160
Total	[1] 611,213,000	[2] 32,418	1,629,471	15,725	395,295	3,191,265	648,954	2,673,720

[1] 366,727,800 pounds.

[2] Of this quantity 22,666 tons, valued at $1,084,754, were reported as dry scrap, and 9,752 tons, valued at $544,717, as fish meal.

Products of the menhaden industry, 1921 to 1930

Year	Dried scrap and meal		Acidulated scrap		Oil		Total
	Tons	*Value*	*Tons*	*Value*	*Gallons*	*Value*	*Value*
1921	37,858	$1,380,455	44,804	$905,640	6,260,478	$1,719,892	$4,005,987
1922	67,821	2,665,441	25,755	556,317	7,102,677	2,904,833	6,126,591
1923	43,452	2,029,406	44,935	1,064,870	7,461,365	3,316,277	6,410,553
1924	21,008	996,866	24,409	495,684	3,923,904	1,817,626	3,310,176
1925	30,167	1,519,458	41,463	1,102,051	6,023,108	3,001,106	5,622,615
1926	24,226	1,164,396	23,553	548,204	3,942,821	1,729,160	3,441,760
1927	26,417	1,406,915	19,984	566,590	3,957,068	1,716,474	3,689,979
1928	24,681	1,453,651	20,028	531,238	3,585,569	1,455,376	3,440,265
1929	33,041	1,625,694	23,089	622,544	3,172,735	1,381,816	3,630,054
1930	32,418	1,629,471	15,725	395,295	3,191,265	648,954	2,673,720

CURED FISHERY PRODUCTS TRADE

The production of cured fishery products in the marine and lake sections of the United States and Alaska in 1929 amounted to 119,257,056 pounds, valued at $18,191,081. Of this amount 75,832,709 pounds, valued at $7,347,253, were salted; 36,490,815 pounds, valued at $9,446,612, were smoked; 4,746,634 pounds, valued at $1,214,205, were dried; and 2,186,898 pounds, valued at $183,011, were spiced.

Considered according to value, mild-cured salmon was the most important salted product, amounting to 12,433,559 pounds, valued at $3,547,175. Cod was of second importance accounting for 16,740,982 pounds, valued at $1,308,319; and Scotch-cure Alaska herring ranked third, amounting to 6,545,125 pounds, valued at $527,384.

Among the smoked products group, salmon, including kippered salmon, was the most important item with respect to value, amounting to 8,973,348 pounds, valued at $3,095,501. The combined production of cisco, chubs, and tullibee ranked second with a production of 8,169,635 pounds, valued at $2,262,051; and sturgeon ranged third with a production of 1,599,669 pounds, valued at $1,468,751.

Among the dried products, shrimp was by far the most important item, amounting to 2,727,720 pounds, valued at $1,052,883. In the spiced group alewives accounted for 1,657,500 pounds, valued at $63,800. The production of spiced alewives were produced in Pennsylvania and North Carolina; spiced sea herring in Pennsylvania, Washington, and Alaska; spiced lake herring in New York and Minnesota; dried salmon in Alaska; dried shrimp in Louisiana and California; dried squeteagues in Louisiana; and stock fish in Alaska.

Summary of production of cured fishery products in the marine and lake sections of the United States and Alaska, 1929

Products	Pounds	Value
SALTED		
Alewives, including pickled and corned alewives	10, 145, 295	$270, 912
Bonito	12, 648	1, 117
Cisco and chubs, including pickled chubs	152, 500	9, 275
Cod	16, 740, 982	1, 308, 319
Cusk	521, 941	21, 340
Eels	98, 000	9, 290
Haddock	2, 504, 899	115, 967
Hake	6, 966, 468	264, 773
Herring, sea and pickled sea herring, New England	268, 545	18, 300
Herring, sea, dry-salted, Alaska	150, 000	8, 000
Herring, sea, Norwegian-cure, Alaska	128, 565	9, 203
Herring, sea, roused, Alaska	149, 200	7, 500
Herring, sea, Scotch-cure, Alaska	6, 545, 125	527, 384
Lake herring, including pickled lake herring	6, 113, 201	240, 431
Lake trout	15, 020	1, 032
Mackerel, including pickled mackerel	6, 434, 948	501, 540
Mullet	2, 456, 870	184, 832
Mullet roe	64, 812	17, 033
Pollock	2, 239, 202	126, 909
Sablefish, including pickled sablefish	175, 129	14, 771
Salmon	70, 150	5, 758
Salmon, dry-salted	3, 123	165
Salmon, mild-cured	12, 433, 559	3, 547, 175
Salmon, pickled	681, 400	73, 020
Sardines	352, 095	17, 148
Sea bass, including black and white sea bass	40, 903	5, 575
Sounds	18, 039	1, 527
Spot	142, 800	10, 472
Sturgeon caviar	1, 941	2, 166
Tongues and cheeks	19, 782	1, 691
Whitefish caviar	3, 381	1, 352
Other salted products	182, 186	23, 276
Total	75, 832, 709	7, 347, 253
SPICED		
Alewives	1, 657, 500	63, 800
Herring, sea	150, 823	45, 100
Lake herring	241, 000	42, 735
Other spiced products	137, 575	31, 376
Total	2, 186, 898	183, 011
SMOKED		
Alewives	592, 000	$25, 675
Butterfish	512, 364	136, 393
Carp	671, 383	264, 212
Cisco, chubs, and tullibee	8, 169, 635	2, 262, 051
Cod fillets	408, 157	65, 571
Cusk fillets	746. 955	104, 560
Eels	131, 166	51, 183
Finnan haddie	2, 911, 567	351, 128
Haddock fillets	471, 404	89, 534
Hake fillets	62, 504	9, 115
Halibut	31, 250	9, 013
Herring, sea, bloaters, New England	3, 404, 133	325, 363
Herring, sea, boneless, New England	2, 330, 090	233, 880
Herring, sea, lengthwise, New England	71, 206	9, 880
Herring, sea, medium scale, New England	499, 185	43, 062
Herring, sea, other	1, 847, 185	210. 215
Lake herring	80, 500	10. 500
Lake trout	611, 460	169, 125
Mackerel	357, 209	73, 742
Sablefish, including pickled sablefish	1, 250, 520	199, 192
Salmon	6. 383. 024	2. 516. 245
Salmon, kippered	2, 590. 324	579, 256
Shad	152. 924	30. 665
Sturgeon	1, 599. 669	1, 468. 751
Whitefish	586, 715	204, 411
Other smoked products	18, 250	3, 890
Total	36, 490, 815	9, 446, 612
DRIED		
Salmon	1, 430, 900	128, 925
Shrimp	2, 727, 720	1, 052, 883
Squeteagues	31, 400	7, 850
Stock fish	8, 700	1, 370
Other dried products	547, 914	23, 177
Total	4, 746, 634	1, 214, 205
Grand total cured products	119, 257, 056	18, 191, 081

SALTED AND SMOKED FISHERY PRODUCTS

Of the total products of the marine and lake sections of the United States and Alaska salted during 1929, the New England section accounted for 39 per cent of the quantity and 27 per cent of the value; the Chesapeake Bay section, 7 per cent of the quantity and 2 per cent of the value; the South Atlantic and Gulf section, 9 per cent of the quantity and 4 per cent of the value; the Pacific Coast section, 20 per cent of the quantity and 37 per cent of the value; the Lakes section, 8 per cent of the quantity and 4 per cent of the value; and Alaska, 17 per cent of the quantity and 26 per cent of the value.

In the smoked fish group the New England section accounted for 32 per cent of the quantity and 15 per cent of the value; the Middle Atlantic section, 41 per cent of the quantity and 60 per cent of the value; Pacific Coast section, 11 per cent of the quanity and 8 per cent of the value; the Lakes section, 16 per cent of the quantity and 17 per cent of the value; and Alaska less than one-half of 1 per cent each of the quantity and value.

NEW ENGLAND SECTION

The production of salted and smoked fishery products in New England in 1929 amounted to 41,452,240 pounds, valued at $3,387,827. Of this amount, salted fish comprised 29,732,567 pounds, valued at $1,997,573; and smoked fish 11,719,673 pounds, valued at $1,390,254.

The production of salted fish was comprised mostly of cod, hake, mackerel, pollock, and haddock; and that of smoked fish principally herring and finnan haddie.

MIDDLE ATLANTIC SECTION

The production of smoked fish in the Middle Atlantic section in 1929 amounted to 14,915,415 pounds, valued at $5,664,981. This production includes that of two firms in Maryland. Only a small amount of products were salted in the Middle Atlantic section, and these have been included in the Chesapeake Bay section. The principle products smoked were salmon; cisco, chubs, and tullibee; sturgeon; and finnan haddie.

CHESAPEAKE BAY SECTION

The production of salted products in the Chesapeake Bay section in 1929 amounted to 5,279,925 pounds, valued at $165,071. This includes a small amount of salted products which were produced in Delaware, but does not include the production of two firms in Baltimore which smoked fish. The output of the latter establishments were included in the Middle Atlantic section. Most of the production of salted products consisted of corned, pickled, and tight-pack cut alewives.

SOUTH ATLANTIC AND GULF SECTION

The production of salted fish in the South Atlantic and Gulf section in 1929 amounted to 6,769,543 pounds, valued at $283,261. Most of this production consisted of alewives and mullet. No fish were smoked in this section.

PACIFIC COAST SECTION

The production of salted and smoked fish in the Pacific Coast section in 1929 amounted to 18,687,734 pounds, valued at $3,479,886. Salted fish accounted for 14,762,551 pounds, valued at $2,718,635; and smoked fish, 3,925,183 pounds, valued at $761,251.

Mild-cured salmon and dry-salted cod were the most important salted products and kippered salmon was the most important smoked product.

LAKES SECTION

The production of salted and smoked fish in the Lakes section in 1929 amounted to 12,298,300 pounds, valued at $1,906,008. Of this amount, salted fish comprised 6,372,772 pounds, valued at $276,912; and smoked fish, 5,925,528 pounds, valued at $1,629,096. Lake herring was by far the most important of the salted products and cisco, chubs, and tullibee and salmon made up most of the smoked fish group.

ALASKA

The production of salted and smoked fish in Alaska in 1929, amounted to 12,920,367 pounds, valued at $1,906,831. Of this amount, salted fish comprised 12,915,351 pounds, valued at $1,905,801; and smoked fish 5,016 pounds, valued at $1,030. Of the salted products, mild-cured salmon and Scotch-cure herring were the most important. The smoked group consisted entirely of salmon.

Production of salted and smoked fishery products in 1929, by sections [1]

NEW ENGLAND

Products	Maine [2]		Massachusetts		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SALTED						
Alewives	[3] 542, 500	[3] $17, 000	(3)	(3)	542, 500	$17, 000
Alewives, pickled	274, 000	9, 590			274, 000	9, 590
Cod	3, 236, 941	198, 246	6, 698, 152	$719, 186	9, 935, 093	917, 432
Cusk	177, 905	6, 743	344, 036	14, 597	521, 941	21, 340
Haddock	492, 399	22, 590	2, 012, 500	93, 377	2, 504, 899	115, 967
Hake	4, 518, 299	163, 454	2, 448, 169	101, 319	6, 966, 468	264, 773
Herring, sea	(4)	(4)	[4] 15, 345	[4] 1, 076	15, 345	1, 076
Mackerel	156, 550	18, 091	6, 054, 398	471, 285	6, 210, 948	489, 376
Sounds			18, 039	1, 527	18, 039	1, 527
Pollock	474, 703	20, 384	1, 764, 499	106, 525	2, 239, 202	126, 909
Tongues and cheeks	(4)	(4)	[4] 19, 782	[4] 1, 691	19, 782	1, 691
Other salted products [5]			484, 350	30, 892	484, 350	30, 892
Total	9, 873, 297	456, 098	19, 859, 270	1, 541, 475	29, 732, 567	1, 997, 573
SMOKED						
Alewives	[3] 530, 000	[3] 18, 035	(3)	(3)	530, 000	18, 035
Cod fillets	(4)	(4)	[4] 406, 157	[4] 65, 171	406, 157	65, 171
Cusk fillets	(4)	(4)	[4] 746, 955	[4] 104, 560	746, 955	104, 560
Finnan haddie	874, 800	123, 234	813, 667	76, 039	1, 688, 467	199, 273
Haddock fillets	(4)	(4)	[4] 355, 404	[4] 60, 284	355, 404	60, 284
Hake fillets			62, 540	9, 115	62, 540	9, 115
Halibut			31, 150	8, 985	31, 150	8, 985
Herring, sea:						
Bloaters	1, 405, 514	88, 664	1, 998, 619	236, 699	3, 404, 133	325, 363
Boneless	[3] 2, 330, 090	[3] 233, 880	(3)	(3)	2, 330, 090	233, 880
Kippered			19, 900	3, 582	19, 900	3, 582
Lengthwise	71, 206	9, 880			71, 206	9, 880
Medium scale	499, 185	43, 062			499, 185	43, 062
Miscellaneous herring	613, 500	26, 681	375, 930	79, 668	989, 430	106, 349
Mackerel	(4)	(4)	[4] 209, 056	[4] 47, 395	209, 056	47, 395
Other smoked products [6]	3, 000	240	373, 000	155, 080	376, 000	155, 320
Total	6, 327, 295	543, 676	5, 392, 378	846, 578	11, 719, 673	1, 390, 254

See footnotes at end of table.

Production of salted and smoked fishery products in 1929, by sections—Continued

MIDDLE ATLANTIC

Products	New York		New Jersey		Pennsylvania [7]		Total	
SMOKED	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Butterfish	420, 624	$111, 970	30, 000	$9, 250	56, 240	$13, 248	506, 864	$134, 468
Carp	524, 583	205, 842	78, 000	35, 100	44, 800	15, 700	647, 383	256, 642
Cisco, chubs, and tullibee	2, 185, 251	714, 596	200, 000	67, 500	1, 653, 000	479, 750	4, 038, 251	1, 261, 846
Eels	[8] 103, 166	[8] 41, 033	(8)	(8)			103, 166	41, 033
Finnan haddie	1, 143, 100	135, 855			80, 000	16, 000	1, 223, 100	151, 855
Haddock fillets	[9] 116, 000	[9] 29, 250			(9)	(9)	116, 000	29, 250
Herring, sea	141, 855	24, 734	23, 000	3, 520	538, 000	58, 530	702, 855	86, 784
Lake trout	[8] 28, 360	[8] 8, 890	(8)	(8)	120, 000	47, 000	148, 360	55, 890
Mackerel	[8] 110, 753	[8] 19, 927	(8)	(8)	10, 900	2, 180	121, 653	22, 107
Salmon	3, 480, 129	1, 329, 209	505, 000	202, 000	943, 225	379, 790	4, 928, 354	1, 910, 999
Shad	[8] 32, 174	[8] 3, 800	(8)	(8)	99, 250	21, 535	131, 424	25, 335
Sturgeon	1, 453, 005	1, 343, 032	39, 000	38, 900	80, 000	67, 000	1, 572, 005	1, 448, 932
Whitefish			200, 000	76, 000	37, 000	10, 800	237, 000	86, 800
Other smoked fish [10]					439, 000	153, 040	439, 000	153, 040
Total	9, 739, 000	3, 968, 138	1, 075, 000	432, 270	4, 101, 415	1, 264, 573	14, 915, 415	5, 664, 981

CHESAPEAKE BAY

Products	Maryland [11]		Virginia [12]		Total	
SALTED	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives:						
Corned and pickled	628, 400	$31, 357	896, 345	$14, 980	1, 524, 745	$46, 337
Tight-pack cut	1, 091, 000	30, 665	2, 582, 600	78, 219	3, 673, 600	108, 884
Eels	80, 000	8, 000			80, 000	8, 000
Sturgeon caviar			1, 580	1, 850	1, 580	1, 850
Total	1, 799, 400	70, 022	3, 480, 525	95, 049	5, 279, 925	165, 071

SOUTH ATLANTIC AND GULF

Products	North Carolina		South Carolina		Florida [13]		Alabama [14]		Total	
SALTED	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	[15] 4, 049, 200	[15] $64, 728			(15)	(15)			4, 049, 200	$64, 728
Eels	13, 000	1, 040			5, 000	$250			18, 000	1, 290
Mullet	910, 400	76, 534	174, 580	$16, 150	760, 690	48, 492	611, 200	$43, 656	2, 456, 870	184, 832
Mullet roe					64, 812	17, 033			64, 812	17, 033
Spot	142, 800	10, 472							142, 800	10, 472
Sturgeon caviar	82	123	279	193					361	316
Other salted products [16]					37, 500	4, 590			37, 500	4, 590
Total	5, 115, 482	152, 897	174, 859	16, 343	868, 002	70, 365	611, 200	43, 656	6, 769, 543	283, 261

See footnotes at end of table.

Production of salted and smoked fishery products in 1929, by sections—Continued

PACIFIC COAST

Products	California		Oregon		Washington		Total	
SALTED	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bonito	12,648	$1,117					12,648	$1,117
Cod, dry-salted	1,622,000	82,510			4,465,551	$268,341	6,087,551	350,851
Salmon					69,800	5,630	69,800	5,630
Salmon, mild-cured	951,225	286,000	2,710,825	$802,811	4,224,309	1,216,641	7,886,359	2,305,452
Sardines	352,095	17,148					352,095	17,148
Other salted products [17]	171,369	22,436	88,264	7,061	94,465	8,940	354,098	38,437
Total	3,109,337	409,211	2,799,089	809,872	8,854,125	1,499,552	14,762,551	2,718,635
SMOKED								
Salmon	(18)	(18)			[18] 245,355	[18] 85,633	245,355	85,633
Salmon, kippered					2,274,308	459,926	2,274,308	459,926
Other smoked products [19]	259,458	62,865			1,146,062	152,827	1,405,520	215,692
Total	259,458	62,865			3,665,725	698,386	3,925,183	761,251

LAKES [20]

Products	Michigan		Indiana		Illinois	
SALTED	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Lake herring	1,987,500	$68,750				
Lake trout						
Whitefish caviar	3,381	1,352				
Other salted fish [22]					(23)	(23)
Total	1,990,881	70,102				
SMOKED						
Carp	[24] 24,000	[24] 7,570				
Cisco, chubs and tullibee	634,500	156,925	[25] 165,410	[25] $40,950	1,662,700	$430,980
Eels	(26)	(26)			[26] 28,000	[26] 10,150
Lake herring						
Lake trout	50,100	11,540	[25] 11,000	2,860	61,000	17,290
Mackerel	(27)	(27)				
Salmon	(28)	(28)			[25] 625,525	[25] 288,481
Sturgeon	(29)	(29)			[29] 27,664	[29] 19,819
Whitefish	50,440	11,810				
Other smoked fish [31]	3,000	855			[30] 10,101	[30] 2,028
Total	762,040	188,700	176,410	43,810	2,414,989	768,748

Products	Wisconsin		Minnesota		Total	
SALTED	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cisco and chubs	150,000	$8,400			150,000	$8,400
Lake herring	1,879,701	81,561	2,205,500	$80,400	6,072,701	230,711
Lake trout	[21] 15,020	[21] 1,032	(21)	(21)	15,020	1,032
Whitefish caviar					3,381	1,352
Other salted fish [22]	[23] 131,670	[23] 35,417			131,670	35,417
Total	2,176,391	126,410	2,205,500	80,400	6,372,772	276,912
SMOKED						
Carp	(24)	(24)			24,000	7,570
Cisco, chubs and tullibee	1,570,274	349,480	98,500	21,870	4,131,384	1,000,205
Eels					28,000	10,150
Lake herring	[21] 80,500	[21] 10,500	(21)	(21)	80,500	10,500
Lake trout	333,000	78,345			455,100	110,035
Mackerel	[27] 6,500	[27] 1,240			6,500	1,240
Salmon	135,040	24,300	[28] 268,750	[28] 123,652	1,029,315	436,433
Sturgeon					27,664	19,819
Whitefish	[30] 79,525	[30] 18,451			129,965	30,261
Other smoked fish [31]					13,100	2,883
Total	2,204,839	482,316	367,250	145,522	5,925,528	1,629,096

See footnotes at end of table.

Production of salted and smoked fishery products in 1929, by sections—Continued

ALASKA

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SALTED								
Cod, dry-salted			704, 538	$38, 306			704, 538	$38, 306
Cod, tongues			600	80			600	80
Herring, dry-salted					150, 000	$8, 000	150, 000	8, 000
Herring, Norwegian-cure	91, 165	$5, 703			37, 400	3, 500	128, 565	9, 203
Herring, roused					149, 200	7, 500	149, 200	7, 500
Herring, Scotch-cure	1, 244, 250	88, 609	200, 250	13, 660	5, 100, 625	425, 115	6, 545, 125	527, 384
Salmon, dry-salted	3, 123	165					3, 123	165
Salmon, mild-cured	4, 318, 400	1, 200, 147	228, 800	41, 576			4, 547, 200	1, 241, 723
Salmon, pickled	77, 800	8, 040	272, 300	35, 963	331, 300	29, 017	681, 400	73, 020
Sablefish pickled	5, 600	420					5, 600	420
Total	5, 740, 338	1, 303, 084	1, 406, 488	129, 585	5, 768, 525	473, 132	12, 915, 351	1, 905, 801
SMOKED								
Salmon, kippered and beleke					5, 016	1, 030	5, 016	1, 030

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[1] Detailed figures can not be given showing the production of spiced and dried fishery products by sections. In general, spiced alewives were produced in Pennsylvania and North Carolina; spiced sea herring in Pennsylvania, Washington, and Alaska; spiced lake herring, in New York and Minnesota; dried salmon, in Alaska; dried shrimp, in Louisiana and California; dried squeteagues, in Louisiana; and stockfish, in Alaska.

[2] Includes a small quantity of finnan haddie smoked in New Hampshire.

[3] The production of Massachusetts has been included with that of Maine.

[4] The production of Maine has been included with that of Massachusetts.

[5] Includes pickled mackerel, salted salmon, pickled sea herring, and shad.

[6] Includes flounders, hake, lake trout, salmon, shad, and whitefish.

[7] Includes the production of 2 firms in Maryland.

[8] The production of New Jersey is included with that of New York.

[9] The production of Pennsylvania is included with that of New York.

[10] Includes smoked alewives and cod fillets, kippered salmon, and smoked Russian whitefish.

[11] The production of smoked fish, manufactured by 2 firms in Baltimore has been included with Pennsylvania.

[12] Includes a small amount of sturgeon caviar which was produced in Delaware.

[13] Includes a small production of mullet roe and some salted shrimp which are included under "Other salted products," both of which were produced in Alabama.

[14] Includes the production in Mississippi.

[15] A very small production of Florida has been included with North Carolina.

[16] Includes salted tenpounder, bluefish, spanish mackerel, and shrimp.

[17] Includes salted anchovies, barracuda, mackerel, sablefish, sea bass, whitefish, and yellowtail.

[18] The production of California has been included with that of Washington.

[19] Includes smoked herring and sablefish and kippered sablefish.

[20] The production of salted fish in New York has been included with Wisconsin and the production of smoked fish in New York and Ohio has been included with Illinois, Indiana, and Michigan as indicated by footnotes.

[21] The production of Minnesota is included with Wisconsin.

[22] Includes salted suckers and whitefish, and pickled alewives, chubs, and lake herring.

[23] The production of Illinois is included with Wisconsin.

[24] The production of Wisconsin as well as that in Ohio is included with Michigan.

[25] Includes the production in New York and Ohio.

[26] The production of Michigan as well as that of New York is included with Illinois.

[27] The production of Michigan is included with Wisconsin.

[28] The production of Michigan is included with Minnesota.

[29] The production of Michigan as well as that of Ohio is included with Illinois.

[30] Includes the production of Ohio.

[31] Includes smoked butterfish, halibut, and shad.

TIGHT-PACK CUT HERRING

During 1930 there were 6,968,590 pounds of tight-pack cut herring, valued at $216,753, packed in Maryland and Virginia. Of this amount 825,000 pounds, valued at $21,300, were packed in Maryland, and 6,143,590 pounds, valued at $195,453, were packed in Virginia. The pack increased 205 per cent in quantity and 157 per cent in value as compared with the pack of the previous year in these States.

There were 34 firms engaged in the industry, 4 of which were in Maryland and 30 in Virginia.

PACKAGED FISHERY PRODUCTS TRADE

In 1930, fresh, frozen, and smoked packaged fishery products were prepared in 7 plants in Maine, 55 in Massachusetts, 1 in Connecticut, 29 in New York, 4 in Pennsylvania, 7 in Virginia, 1 in North Carolina, 5 in Florida, 1 in Alabama, 5 in Texas, 2 in Ohio, 1 in Michigan, 3 in Washington, 1 in Oregon, and 6 in California—a total of 128 plants or an increase of 16 over those operated in 1929. The production of packaged fish in 1930 amounted to 80,013,572 pounds, valued at $12,579,664, as compared with 84,396,505 pounds, valued at $14,812,987, in 1929. This represents a decrease of 5 per cent in the quantity and 15 per cent in the value. It has been estimated that to produce the packaged-fish products prepared in 1930, 200,000,000 pounds of whole fish were utilized.

According to quantity, by far the most important fish packaged was haddock, which accounted for 78 per cent of the total quantity prepared. Following in order they were cod, with 8 per cent; hake, 3 per cent; cusk, 2 per cent; and shrimp, and squeteagues or "sea trout," each, 1 per cent. About 30 other species were packaged in smaller quantities. Prominent among these species of less importance were flounders and croakers.

The combined production of Massachusetts and Connecticut accounted for 83 per cent of the total output; New York, 7 per cent; Virginia and North Carolina, 3 per cent; Maine, 3 per cent; and Texas, 2 per cent. The total production in all other States amounted to less than 2 per cent of the total.

Considered according to the method of preparation, fillets accounted for 92 per cent of the total; dressed or pan-dressed fish, 3 per cent; steaks, 2 per cent; and sticks, 1 per cent. In addition, shellfish, accounting for 2 per cent of the total, were packaged. Of the total quantity, 69 per cent were marketed fresh, 28 per cent frozen, and 3 per cent smoked.

Production of fresh, frozen, and smoked packaged fishery products in the United States, 1930

Species	Maine		Massachusetts and Connecticut		New York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					(1)	(1)
Cod	405,545	$65,588	4,303,235	$597,374	[2] 1,893,235	[2] $307,675
Cusk	198,440	32,991	1,114,533	159,646		
Flounders, including "sole"	11,300	1,843	613,286	119,361	254,000	58,070
Haddock	1,426,457	221,078	57,176,224	9,010,259	3,254,963	563,825
Hake	339,843	49,231	1,931,583	244,746	147,000	19,777
Halibut			14,835	3,875		
Mackerel			[4] 122,906	[4] 23,924		
Pollock			[5] 236,187	[5] 30,486	(5)	(5)
Salmon			1,902	499		
Whiting			551,378	59,876		
Wolffish	(7)	(7)	[7] 75,442	[7] 11,273		
Miscellaneous [8]			10,458	2,613		
Total	2,381,585	370,731	66,151,969	10,263,932	5,549,198	949,347

See footnotes at end of table.

Production of fresh, frozen, and smoked packaged fishery products in the United States, 1930—Continued

Species	Virginia and North Carolina		Florida and Alabama		Pennsylvania, Ohio, and Michigan	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					[1] 534, 733	[1] $80, 284
Butterfish	65, 486	$7, 835				
Cod	(2)	(2)				
Croaker	885, 105	87, 099				
Flounders, including "sole"	[3] 85, 591	[3] 10, 041	(3)	(3)		
Groupers			142, 808	$25, 972		
Haddock	288, 171	48, 839				
Snapper, red			75, 298	19, 144		
Spot	34, 445	4, 451				
Squeteagues or "sea trout"	[6] 1, 035, 974	[6] 122, 424	(6)	(6)		
Whiting	88, 445	6, 023				
Yellow perch					39, 429	7, 774
Miscellaneous [8]	51, 000	5, 250	25, 295	5, 000	159, 376	52, 403
Total	2, 534, 217	291, 962	243, 401	50, 116	733, 538	140, 461

Species	Washington, Oregon, and California		Texas		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					534, 733	$80, 284
Butterfish					65, 486	7, 835
Cod					6, 602, 015	970, 637
Croaker					885, 105	87, 099
Cusk					1, 312, 973	192, 637
Flounders, including "sole"	14, 000	$1, 680			978, 177	190, 995
Groupers					142, 808	25, 972
Haddock					62, 145, 815	9, 844, 001
Hake					2, 418, 426	313, 754
Halibut	89, 438	15, 105			104, 273	18, 980
Mackerel	(4)	(4)			122, 906	23, 924
Pollock					236, 187	30, 486
Salmon	34, 917	5, 565			36, 819	6, 064
Snapper, red					75, 298	19, 144
Spot					34, 445	4, 451
Squeteagues or "sea trout"					1, 035, 974	122, 424
Whiting					639, 823	65, 899
Wolffish					75, 442	11, 273
Yellow perch					39, 429	7, 774
Shrimp			1, 538, 062	$235, 535	1, 538, 062	235, 535
Miscellaneous [8]	743, 247	255, 230			989, 376	320, 496
Total	881, 602	277, 580	1, 538, 062	235, 535	[9] 80, 013, 572	12, 579, 664

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[1] A small amount of blue pike packaged in New York has been included with Pennsylvania, Ohio, and Michigan.

[2] A small amount of cod packaged in Virginia has been included with New York.

[3] A small amount of flounders packaged in Florida has been included with Virginia and North Carolina.

[4] A small amount of mackerel packaged in California has been included with Massachusetts and Connecticut.

[5] A small amount of pollock packaged in New York has been included with Massachusetts and Connecticut.

[6] A small amount of squeteagues packaged in Florida has been included with Virginia and North Carolina.

[7] A small amount of wolffish packaged in Maine has been included with Massachusetts and Connecticut.

[8] Includes abalone, amberjack, bluefish, cisco, lake trout, mullet, sablefish, scallops, shad, snook, Spanish mackerel, swordfish, and whitefish.

[9] Of this amount, 73,753,075 pounds, valued at $11,607,880, were fillets; 2,599,114 pounds, valued at $291,212, were dressed or pan dressed; 1,169,253 pounds, valued at $282,589, were steaks; 947,318 pounds, valued at $160,917, were sticks; and 1,544,812 pounds, valued at $237,066, were shellfish. Of the total quantity of fillets prepared, 50,859,602 pounds, valued at $8,037,133, were fresh; 20,319,329 pounds, valued at $3,122,446, were frozen; and 2,574,144 pounds, valued at $448,301, were smoked. Of the dressed and pan dressed all were marketed fresh, with the exception of 130,967 pounds, valued at $15,327, which were frozen, and a few pounds that were smoked. Of the steaks, 1,067,198 pounds, valued at $265,000, were fresh; and 102,055 pounds, valued at $17,589, were frozen. Of the sticks, 828,350 pounds, valued at $141,874, were fresh; and 118,968 pounds, valued at $19,043, were frozen. The scallops and shrimp were marketed frozen.

Production of fresh, frozen, and smoked packaged fishery products in the United States, various years, 1926 to 1930

Years	Cod		Cusk		Haddock		Hake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1926	1,400,000	(1)	(2)	(1)	14,630,000	(1)	[2] 800,000	(1)
1928	2,056,244	300,466	481,650	66,916	57,058,893	8,490,995	1,143,733	143,885
1929	3,484,751	601,008	1,224,427	184,564	71,366,779	12,731,593	2,616,324	366,860
1930	6,602,015	970,637	1,312,973	192,637	62,145,815	9,844,001	2,418,426	313,754

Years	Squeteagues		All other		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1926	200,000	(1)	1,270,000	(1)	18,300,000	(1)
1928	1,293,835	163,441	3,211,021	624,321	65,245,376	9,790,024
1929	1,324,332	165,896	4,379,892	763,066	84,396,505	14,812,987
1930	1,035,974	122,424	6,498,369	1,136,211	80,013,572	12,579,664

[1] Figures on value are not available.

[2] Cusk, and pollock are included with hake.

FROZEN-FISH TRADE

FISH, FROZEN

In 1930 the freezing plants in the United States and Alaska, reporting their activities to the Government, packed 139,297,228 pounds of frozen fishery products. These products at the time they were held in cold-storage plants were estimated to be valued at $16,500,000. This is the largest frozen pack of fishery products on record and exceeded the volume of the pack in 1929 by 15 per cent. Over 60 per cent of the pack consisted of six groups of fishery products. Of first importance was the cod, haddock, haddock fillets, hake, and pollock group with 17 per cent of the total. Haddock fillets accounted for the bulk of the volume of this group. Of next importance were the salmons, with 12 per cent of the total. Halibut made up 10 per cent of the total; mackerel, 8 per cent; whiting, 7 per cent; and sea herring, 6 per cent. Considerable quantities of shellfish; squid; weakfish, including southern "sea trout"; sablefish or black cod; and cisco or lake herring, including bluefin, blackfin, and chub, also were frozen. Frozen squid and sea herring are marketed primarily for bait, although quantities of each are used for human consumption.

The above pack of frozen fish does not represent the entire amount of fish frozen in the United States, for there are many small private freezers which do not report their activities to the Government. During late years a considerable number of privately owned freezing establishments have been preparing frozen packaged fishery products. The larger of these establishments are now reporting their activities to the Government although a few of the smaller firms still make no report on their activities. However, it is estimated that the figures presented herewith cover about 98 per cent of the trade.

An idea of the production of frozen packaged fish may be obtained from the review on the packaged-fish trade shown elsewhere in this report. In brief, according to this, the frozen pack of packaged fishery products in 1930 amounted to 22,216,131 pounds, valued at $3,411,471 This is an increase of 2 per cent when compared with the volume of these products packed in 1929.

Among the important species by volume frozen in 1930, those in the ground-fish group increased 114 per cent, salmon 28 per cent, whiting 7 per cent, and mackerel 2 per cent over the frozen pack in 1929. Those of halibut and sea herring fared less well, the pack of each decreasing 4 per cent under that in 1929. Unusual increases are noted in the packs of some of the minor species, conspicuous among which is the blue and sauger pike group, which increased 118 per cent over the pack in 1929. That of suckers increased 68 per cent, and weakfish 62 per cent. Considered as a whole there were greater quantities of the various salt-water species frozen in 1930 than in the preceding year, and a trifle less quantity of the fresh-water species.

That frozen fishery products are becoming an established article of diet in the American household is attested by the fact that greater quantities of frozen fishery products were withdrawn from cold-storage plants and entered consumption in 1930 than during the year 1929. This is due, principally, to the increased amount of packaged haddock fillets which entered consumption.

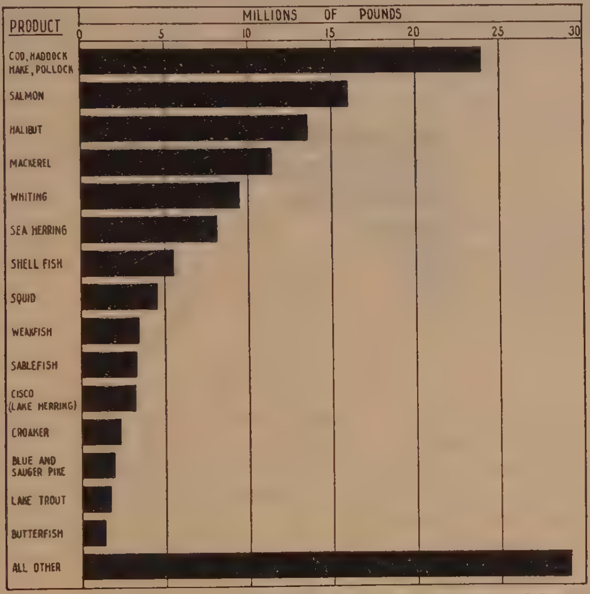

FIGURE 11.—Production of frozen fishery products in the United States and Alaska, 1930

As a general rule most species of fish are frozen during the season when they are in abundance, which is generally during the late spring and summer months of the year. During 1930 over one-half of the frozen pack was put up during the months of May to August inclusive. The amounts frozen during July and August were about equal, each accounting for about 16 per cent of the total. The amounts frozen each month from September to December, inclusive, varied between 5 and 10 per cent. The amounts frozen during the months of January to April, inclusive, were equal, each accounting for about 3 per cent of the total.

The New England section led in the volume of fish frozen during 1930, having 52,624,000 pounds put up there, which was over one-third of the total pack. Haddock fillets was the most important product frozen in the New England section, accounting for about one-third of the total amount of fish frozen there. This product, including the volume of other ground fish, sea herring, mackerel, squid, and whiting accounted for nearly 90 per cent of the fish frozen in this section. In the Pacific section, including Alaska, 38,192,000 pounds were frozen, which is a little more than one-fourth of the total pack. Salmon and halibut were by far the most important species frozen in this section, these accounting for nearly 70 per cent of the production of this section. In the Middle Atlantic section 22,847,000 pounds were frozen, or a little less than one-sixth of the total. A large variety of diversified species were frozen here, although those most prominent were weakfish, mackerel, various species of shellfish, whiting, butterfish, blue and sauger pike, and squid. The freezers in this section preserve large quantities of fish produced by traps along the New Jersey coast. In the North Central East section about 8 per cent of the total were frozen. Here the predominant species were cisco, including blackfin, bluefin, and chub, lake trout, various species of shellfish, whitefish, and blue and sauger pike. The other sections during 1930 were relatively unimportant in the trade, and froze small quantities of fish common to each section.

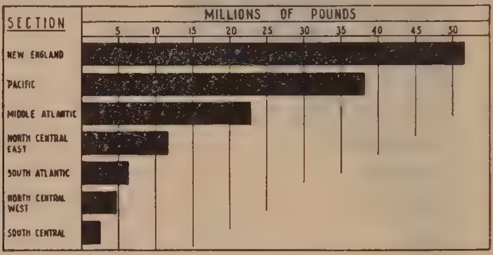

FIGURE 12.—Production of frozen fishery products in the various geographical sections, 1930

The freezing plants in the New England sections were busiest from May to October, inclusive: those in the Pacific section during the months from June to November, inclusive: those in the Middle Atlantic section from May to November, inclusive. In the South Atlantic States the busiest season was during the months of May to August, inclusive, and in the North Central East section, during the months of May, November, and December. The amount of fish frozen monthly in the North Central section was fairly uniform, as were the amounts frozen monthly in the South Central section.

Production of frozen fishery products, 1930

BY SPECIES AND MONTHS

Species	Month ended the 15th of—						
	January	February	March	April	May	June	July
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	11, 419	5, 746	5, 913	6, 330	32, 681	50, 799	49, 612
Butterfish (all trade sizes)	28, 953	32, 490	19, 485	12, 931	363, 387	151, 974	166, 901
Catfish	107, 503	72, 551	13, 270	23, 343	148, 498	100, 086	86, 786
Cisco (Lake Erie)					18, 128	30, 593	93, 108
Cisco (lake herring), including bluefin, blackfin, and chub	76, 662	52, 506	3, 115	41, 476	81, 907	153, 227	275, 107
Cisco (tullibees, Canadian lakes)	70, 142	102, 501	28, 299	32, 786	14, 150	19, 008	74, 279
Cod, haddock, hake, pollock	536, 201	151, 583	157, 124	73, 937	331, 736	302, 905	500, 572
Croakers	32, 595	11, 562	15, 105	19, 521	603, 932	177, 149	693, 442
Flounders	6, 893	32, 540	6, 696	32, 953	90, 190	249, 724	201, 647
Haddock fillets	622, 992	935, 232	852, 639	908, 441	2, 742, 949	1, 854, 147	2, 474, 666
Halibut (all trade sizes)	207, 289	129, 144	548, 852	779, 524	1, 739, 086	1, 910, 004	1, 885, 253
Herring, sea (including alewives and bluebacks)	202, 045	78, 066	456, 476	566, 843	1, 051, 923	524, 213	734, 295
Lake trout	16, 141	6, 557	1, 643	21, 699	78, 866	33, 581	83, 619
Mackerel (except Spanish)	200, 664	339, 087	135, 490	124, 359	793, 900	2, 043, 644	4, 332, 760
Pike, blue and sauger	2, 733	1, 050			676, 451	271, 586	38, 816
Pike, yellow or wall-eyed	18, 442	23, 855		5, 050	25, 200	19, 060	72, 608
Pike (including pickerel, jacks, and yellow jack)	5, 898	24, 568	41, 750	21, 211	39, 254	16, 248	11, 430
Sablefish (black cod)	69, 207	13, 481	19, 714	82, 732	137, 161	203, 458	229, 305
Salmon, chinook	34, 862	4, 876		7, 729	35, 325	227, 267	397, 711
Salmon, silver	61, 163	129, 531	55, 118	64, 528	4, 366	55, 001	626, 079
Salmon, fall and pink	90, 137	94, 367	150, 365	34, 598	14, 955	10, 557	37, 213
Salmon, steelhead trout	68, 664	18, 953	1, 395	60	9, 706	18, 935	445, 826
Salmon, all other	44, 075	105, 864	36, 583	31, 589	40, 098	416, 495	1, 039, 875
Scup (porgies)	293	6, 089	2, 612	569	121, 123	138, 400	220, 302
Shad and shad roe	26, 775	27, 165	10, 045	3, 932	113, 218	220, 352	94, 597
Shellfish	405, 602	283, 787	268, 302	115, 227	649, 368	516, 694	549, 348
Smelts, eulachon, etc	270, 384	392, 978	128, 689	62, 687	34, 010	4, 397	17, 135
Squid	11, 806	4, 707	16, 664	10, 876	1, 773, 812	1, 506, 494	398, 099
Sturgeon and spoonbill cat	4, 885	5, 912	2, 063	17, 297	48, 934	41, 109	31, 870
Suckers	6, 087	750	75	831	35, 493	13, 250	13, 959
Weakfish (including southern "sea trout")	31, 542	1, 512	23, 157	17, 488	476, 779	622, 666	204, 114
Whitefish	93, 750	156, 666	14, 609	33, 893	91, 381	100, 902	169, 302
Whiting	101, 294	58, 624	165, 211	183, 839	104, 921	4, 259, 462	3, 601, 129
Miscellaneous fish	1, 057, 276	895, 404	651, 996	731, 405	2, 456, 220	1, 882, 814	2, 208, 984
Total	4, 524, 374	4, 199, 704	3, 832, 455	4, 069, 684	14, 979, 108	18, 146, 201	22, 059, 749

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	316, 586	93, 801	333, 603	221, 766	13, 533	1, 141, 789
Butterfish (all trade sizes)	114, 364	94, 286	188, 459	203, 456	34, 434	1, 411, 120
Catfish	130, 230	42, 702	39, 310	47, 521	59, 862	871, 662
Cisco (Lake Erie)	70, 208	131, 250	54, 777	45, 856	32, 265	476, 185
Cisco (lake herring), including bluefin, blackfin, and chub	227, 534	118, 770	150, 442	1, 405, 642	698, 276	3, 284, 664
Cisco (tullibees, Canadian lakes)	28, 402	27, 902	60, 134	63, 431	53, 206	574, 240
Cod, haddock, hake, pollock	884, 268	687, 492	475, 201	319, 956	276, 108	4, 697, 083
Croakers	646, 610	92, 759	26, 801	11, 350	6, 608	2, 337, 434
Flounders	83, 624	47, 656	99, 027	238, 977	86, 731	1, 176, 658
Haddock fillets	2, 946, 780	2, 899, 474	2, 083, 854	441, 548	508, 097	19, 270, 819
Halibut (all trade sizes)	2, 291, 800	2, 118, 406	502, 590	713, 713	762, 969	13, 588, 630
Herring, sea (including alewives and bluebacks)	1, 218, 138	956, 622	991, 101	950, 301	362, 323	8, 092, 346
Lake trout	128, 333	107, 454	219, 085	865, 454	162, 358	1, 724, 790
Mackerel (except Spanish)	2, 106, 908	331, 452	649, 590	260, 250	153, 649	11, 471, 753
Pike, blue and sauger	3, 519	45, 833	129, 023	617, 948	159, 609	1, 946, 568
Pike, yellow or wall-eyed	4, 704	60, 244	49, 874	102, 077	30, 972	412, 086
Pike (including pickerel, jacks, and yellow jack)	19, 856	38, 848	41, 470	69, 710	28, 714	358, 957
Sablefish (black cod)	634, 615	704, 999	760, 997	392, 871	39, 422	3, 287, 962
Salmon, chinook	721, 261	424, 900	195, 910	25, 955	6, 750	2, 082, 546
Salmon, silver	1, 411, 630	878, 405	930, 947	1, 452, 513	49, 241	5, 718, 522
Salmon, fall and pink	351, 902	97, 876	279, 036	1, 728, 807	91, 193	2, 981, 006

Production of frozen fishery products, 1930—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Salmon, steelhead trout	538, 074	226, 205	63, 524	14, 859	80, 993	1, 487, 194
Salmon, all other	1, 267, 152	312, 685	182, 956	138, 663	106, 593	3, 722, 628
Scup (porgies)	203, 955	151, 953	50, 442	10, 491	7, 384	913, 613
Shad and shad roe	110, 349	124, 781	2, 238	4, 727	20, 285	758, 464
Shellfish	552, 260	499, 877	607, 662	678, 116	381, 813	5, 508, 056
Smelts, eulachon, etc	36, 092	39, 377	52, 450	27, 937	126, 289	1, 192, 425
Squid	425, 306	306, 733	59, 656	33, 890	30, 580	4, 578, 623
Sturgeon and spoonbill cat	82, 344	18, 015	25, 844	15, 435	7, 045	300, 753
Suckers	69, 121	36, 088	8, 084	12, 140	52, 545	248, 423
Weakfish (including southern "sea trout")	193, 302	306, 437	1, 248, 702	311, 792	31, 558	3, 469, 049
Whitefish	114, 191	130, 727	71, 182	249, 429	104, 851	1, 330, 883
Whiting	436, 678	183, 866	49, 749	217, 686	93, 954	9, 456, 413
Miscellaneous fish	3, 258, 126	1, 360, 924	1, 348, 292	1, 898, 265	1, 674, 178	19, 423, 884
Total	21, 628, 222	13, 698, 799	12, 032, 012	13, 792, 522	6, 334, 388	139, 297, 228

BY GEOGRAPHICAL SECTIONS AND SPECIES[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Species	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
Bluefish (all trade sizes)	41	989	18	94				1, 142
Butterfish (all trade sizes)	230	1, 106	42	33				1, 411
Catfish	127	5	244	140	278	78		872
Cisco (Lake Erie)		441		35				476
Cisco (lake herring), including bluefin, blackfin, and chub		487		1, 734	1, 064			3, 285
Cisco (tullibees, Canadian lakes)	29	158	10	229	134	1	13	574
Cod, haddock, hake, pollock	3, 650	565	14	94	223		151	4, 697
Croakers	1	804	1, 202	309		21		2, 337
Flounders	552	565	2	13			45	1, 177
Haddock fillets	18, 146	277	4	241	320	1	282	19, 271
Halibut (all trade sizes)	299	675		818	124	1	11, 672	13, 589
Herring, sea (including alewives and bluebacks)	5, 380	459	3	590		2	1, 658	8, 092
Lake trout	1	168	5	1, 347	204			1, 725
Mackerel (except Spanish)	8, 398	2, 349	1	191	35		498	11, 472
Pike, blue and sauger		1, 076		863	3	5		1, 947
Pike, yellow or wall-eyed		133		190	89			412
Pike (including pickerel, jacks, and yellow jack)		15	3	112	229			359
Sablefish (black cod)				70	35		3, 183	3, 288
Salmon, chinook	21	45		54	19	2	1, 941	2, 082
Salmon, silver	53	125		90	103		5, 347	5, 718
Salmon, fall and pink	14	36		177	85		2, 669	2, 981
Salmon, steelhead trout		2		1			1, 484	1, 487
Salmon, all other	106	207		104	32		3, 274	3, 723
Scup (porgies)	161	748		5				914
Shad and shad roe	267	133	2	49	3		304	758
Shellfish	774	2, 272	291	903	201	5	1, 062	5, 508
Smelts, eulachon, etc	33	753		85	1		320	1, 192
Squid	3, 487	1, 053		39				4, 579
Sturgeon and spoonbill cat		137	4	12	25	72	51	301
Suckers		3		86		159		248
Weakfish (including southern "sea trout")		2, 634	834			1		3, 469
Whitefish	9	302		876	142	1	1	1, 331
Whiting	7, 870	1, 261	11	5	309			9, 456
Miscellaneous frozen fish	2, 975	2, 864	3, 705	2, 158	1, 139	2, 346	4, 237	19, 424
Total	52, 624	22, 847	6, 395	11, 747	4, 797	2, 695	38, 192	139, 297

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[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska ,and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

Production of frozen fishery products, 1930—Continued

BY GEOGRAPHICAL SECTIONS AND MONTHS[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
January	1, 127	1, 105	139	870	348	79	856	4, 524
February	1, 061	1, 127	100	612	442	138	720	4, 200
March	952	467	51	345	308	163	1, 546	3, 832
April	1, 043	391	18	263	343	181	1, 831	4, 070
May	5, 461	3, 414	1, 057	1, 362	413	525	2, 747	14, 979
June	9, 107	3, 546	898	780	244	311	3, 260	18, 146
July	12, 482	2, 023	1, 259	609	478	317	4, 892	22, 060
August	8, 491	2, 237	1, 129	800	299	382	8, 290	21, 628
September	5, 933	1, 647	204	714	135	165	4, 901	13, 699
October	4, 061	3, 097	293	793	433	131	3, 224	12, 032
November	1, 756	2, 648	423	3, 219	828	163	4, 756	13, 793
December	1, 150	1, 145	824	1, 380	526	140	1, 169	6, 334
Total	52, 624	22, 847	6, 395	11, 747	4, 797	2, 695	38, 192	139, 297

[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central West —Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

Production of frozen fishery products in various years, 1920 to 1930

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Month ended the 15th of—												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
1920	2, 291	2, 274	2, 630	2, 465	3, 688	10, 094	12, 762	13, 620	11, 804	11, 169	9, 712	9, 751	92, 260
1921	4, 005	2, 843	1, 770	2, 413	2, 698	9, 624	10, 151	9, 845	9, 356	9, 990	9, 869	8, 173	80, 737
1922	2, 442	1, 453	1, 364	1, 497	1, 980	5, 850	7, 376	9, 121	10, 827	16, 830	9, 344	7, 070	75, 154
1923	2, 742	1, 662	1, 412	1, 400	5, 027	7, 671	11, 872	13, 944	16, 417	12, 512	6, 952	9, 938	91, 549
1924	3, 179	2, 440	2, 417	2, 729	6, 040	8, 282	11, 996	15, 542	10, 585	14, 878	10, 855	8, 381	97, 324
1925	3, 933	2, 913	3, 488	4, 315	5, 857	10, 800	11, 221	10, 902	11, 595	8, 593	11, 718	6, 550	91, 165
1928	2, 349	2, 849	4, 542	2, 202	5, 518	18, 415	16, 046	17, 130	11, 263	9, 373	13, 403	10, 548	113, 638
1929	4, 511	4, 128	3, 369	5, 241	7, 004	14, 383	15, 833	17, 559	12, 771	11, 830	15, 343	9, 571	121, 543
1930	4, 524	4, 200	3, 832	4. 070	14, 979	18, 146	22, 060	21, 628	13, 699	12, 032	13, 793	6, 334	139, 297

Production of frozen fishery products in 1930 and 1929, compared

Species	1930	1929	Increase (+) or decrease (—) compared with 1929
	Pounds	*Pounds*	*Per cent*
Bluefish (all trade sizes)	1, 141, 789	883, 954	+29
Butterfish (all trade sizes)	1, 411, 120	2, 932, 606	—52
Catfish	871, 662	864, 997	+1
Cisco (Lake Erie)	476, 185	339, 852	+40
Cisco (lake herring), including bluefin, blackfin, and chub	3, 284, 664	2, 930, 149	+12
Cisco (tullibees, Canadian lakes)	574, 240	739, 663	—22
Cod, haddock, hake, pollock (including haddock fillets)	23, 967, 902	11, 179, 959	+114
Croakers	2, 337, 434	2, 877, 996	—19
Flounders	1, 176, 658	1, 540, 993	—24
Halibut (all trade sizes)	13, 588, 630	14, 083, 230	—4
Herring, sea (including alewives and bluebacks)	8, 092, 346	8, 408, 539	—4
Lake trout	1, 724, 790	2, 036, 149	—15
Mackerel (except Spanish)	11, 471, 753	11, 301, 474	+2
Pike, blue and sauger	1, 946, 568	892, 257	+118
Pike, yellow or wall-eyed	412, 086	256, 530	+61
Pike (including pickerel, jacks, and yellow jack)	358, 957	626, 724	—43
Sablefish (black cod)	3, 287, 962	2, 336, 833	+41
Salmon, chinook	2, 082, 546	1, 489, 542	+40
Salmon, silver	5, 718, 522	4, 859, 836	+18
Salmon, fall and pink	2, 981, 006	2, 542, 648	+17
Salmon, steelhead trout	1, 487, 194	1, 175, 172	+27
Salmon, all other	3, 722, 628	2, 374, 141	+57
Scup (porgies)	913, 613	1, 065, 782	—14
Shad and shad roe	758, 464	603, 350	+26
Shellfish	5, 508, 056	4, 620, 508	+19
Smelts, eulachon, etc	1, 192, 425	1, 316, 163	—9
Squid	4, 578, 623	3, 785, 671	+21
Sturgeon and spoonbill cat	300, 753	1, 176, 221	—74
Suckers	248, 423	147, 819	+68
Weakfish (including southern "sea trout")	3, 469, 049	2, 145, 746	+62
Whitefish	1, 330, 883	1, 961, 625	—32
Whiting	9, 456, 413	8, 834, 081	+7
Miscellaneous fish	19, 423, 884	19, 212, 379	+1
Total	139, 297, 228	121, 542, 589	+15

Production of certain species of frozen fish for various years, 1920 to 1930

Year	Mackerel	Salmon[1]	Halibut	Whiting	Cod, haddock, hake, and pollock[2]
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1920	4, 835, 173	7, 836, 620	10, 625, 029	10, 208, 755	3, 940, 163
1921	2, 694, 684	10, 033, 619	10, 733, 803	5, 527, 047	1, 922, 154
1922	6, 165, 248	12, 143, 194	5, 122, 396	6, 058, 126	1, 045, 462
1923	7, 248, 381	11, 043, 424	10, 211, 251	8, 664, 680	2, 222, 677
1924	5, 457, 676	14, 309, 666	14, 650, 787	7, 528, 339	1, 862, 163
1925	8, 948, 297	12, 153, 515	12, 041, 155	10, 152, 799	2, 781, 419
1928	11, 550, 854	14, 644, 785	12, 525, 445	10, 514, 686	4, 854, 217
1929	11, 301, 474	12, 441, 339	14, 083, 230	8, 834, 081	11, 179, 959
1930	11, 471, 753	15, 991, 896	13, 588, 630	9, 456, 413	23, 967, 902

[1] Including steelhead trout.

[2] Including haddock fillets.

HOLDINGS

During 1930 the average monthly holdings of frozen fish and shellfish increased 12 per cent over the average monthly holdings during 1929, and 25 per cent over the 5-year average of monthly holdings. Individual monthly holdings during the year were all above normal when compared with the 5-year average, being from 4 to 39 per cent higher. Compared with the respective monthly holdings in 1929 they were from about 1 to 26 per cent greater during 10 months of the year, and 6 to 20 per cent less during the remaining 2 months of the year.

Monthly holdings in 1930 were largest from July to December, inclusive, being, in some instances, three to nearly four times those for certain months from January to June, inclusive. A maximum of 91,872,000 pounds were held on November 15, and a minimum of 25,357,000 pounds on April 15. Holdings during the year averaged 62,430,000 pounds monthly.

On the average the monthly holdings in the New England section were largest in 1930, amounting to 17,914,000 pounds. Large quantities of frozen packaged fish were held in this section. Monthly holdings in the Pacific section were second largest and amounted to 14,551,000 pounds. Monthly holdings in the Middle Atlantic section were third largest and amounted to 13,497,000 pounds on the average. The large holdings in this section are due to the imports from other sections, where they are stored pending sale in the large consumption centers in the Middle Atlantic section. The monthly holdings in the other sections averaged between 1,003,000 pounds and 8,322,000 pounds.

Holdings of frozen fishery products, by species and months, 1930

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	450, 921	313, 145	213, 134	132, 175	141, 334	178, 700
Butterfish (all trade sizes)	1, 632, 123	1, 070, 371	519, 197	177, 324	469, 358	535, 684
Catfish	477, 514	397, 470	209, 661	133, 825	251, 014	311, 285
Cisco (Lake Erie)	122, 901	65, 079	57, 214	49, 141	53, 079	72, 715
Cisco (lake herring), including bluefin, blackfin, and chub	1, 622, 678	1, 035, 756	709, 087	511, 444	482, 090	622, 944
Cisco (tullibees, Canadian lakes)	1, 286, 929	1, 659, 150	1, 414, 540	1, 229, 456	1, 036, 770	949, 875
Cod, haddock, hake, pollock	1, 729, 385	1, 419, 090	1, 286, 315	960, 286	1, 031, 802	1, 156, 063
Croakers	717, 391	466, 255	151, 870	64, 571	639, 298	772, 296
Flounders	626, 792	482, 653	382, 394	311, 116	323, 615	505, 683
Haddock fillets	3, 737, 989	3, 370, 228	2, 638, 016	1, 771, 368	3, 103, 876	3, 822, 856
Halibut (all trade sizes)	6, 870, 237	4, 586, 295	2, 823, 334	2, 927, 217	4, 317, 494	6, 099, 571
Herring, sea (including alewives and bluebacks)	2, 429, 535	1, 503, 036	1, 448, 951	1, 487, 169	2, 229, 218	2, 338, 194
Lake trout	1, 590, 515	1, 236, 050	888, 056	576, 840	610, 163	619, 835
Mackerel (except Spanish)	6, 321, 345	4, 325, 027	2, 718, 941	766, 224	1, 303, 506	3, 198, 894
Pike, blue and sauger	1, 005, 761	755, 984	402, 925	190, 256	720, 884	880, 948
Pike, yellow or wall-eyed	483, 145	439, 301	434, 450	280, 065	251, 491	257, 072
Pike (including pickerel, jacks, and yellow jack)	748, 801	741, 803	679, 536	503, 196	420, 947	333, 783
Sablefish (black cod)	1, 474, 412	821, 067	537, 465	448, 779	459, 730	517, 150
Salmon, chinook	1, 081, 335	947, 232	680, 740	519, 162	274, 872	421, 381
Salmon, silver	2, 745, 188	1, 921, 202	1, 009, 827	569, 393	359, 582	354, 021
Salmon, fall and pink	1, 738, 931	1, 236, 798	830, 113	593, 822	444, 021	411, 358
Salmon, steelhead trout	309, 843	200, 440	79, 460	48, 526	33, 344	40, 538
Salmon, all other	1, 240, 959	1, 078, 930	580, 373	368, 095	326, 345	687, 121
Scup (porgies)	626, 784	489, 384	314, 415	92, 303	190, 724	311, 778
Shad and shad roe	389, 041	269, 040	176, 664	123, 832	255, 191	462, 153
Shellfish	2, 082, 536	1, 808, 998	1, 523, 152	1, 030, 099	1, 191, 236	1, 404, 923
Smelts, eulachon, etc	393, 315	643, 721	968, 661	546, 885	467, 563	451, 934
Squid	1, 206, 275	907, 255	430, 303	111, 275	1, 772, 719	3, 170, 893
Sturgeon and spoonbill cat	979, 355	1, 277, 941	1, 201, 548	1, 190, 498	1, 218, 902	1, 134, 667
Suckers	84, 473	63, 776	38, 776	26, 831	58, 700	69, 066
Weakfish (including southern "sea trout")	1, 263, 275	844, 942	536, 112	248, 665	669, 517	1, 250, 686
Whitefish	1, 918, 397	1, 985, 937	1, 758, 496	1, 292, 309	1, 212, 037	1, 236, 450
Whiting	5, 177, 756	3, 636, 209	2, 398, 200	1, 399, 793	1, 013, 294	4, 964, 204
Miscellaneous fish	7, 851, 472	7, 012, 020	5, 538, 826	4, 675, 178	6, 805, 445	8, 046, 945
Total	62, 417, 309	49, 011, 585	35, 580, 752	25, 357, 118	34, 139, 161	47, 631, 666

Holdings of frozen fishery products, by species and months, 1930—Continued

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	198,760	502,707	488,623	639,611	718,105	588,534
Butterfish (all trade sizes)	652,462	731,846	727,592	855,495	920,868	717,014
Catfish	372,014	507,564	512,723	422,257	400,627	466,372
Cisco (Lake Erie)	159,489	189,150	267,260	286,150	292,538	385,954
Cisco (lake herring), including bluefin, blackfin, and chub	843,980	863,511	911,078	984,892	2,332,527	2,513,274
Cisco (tullibees, Canadian lakes)	899,107	916,399	937,880	955,607	1,194,284	1,338,132
Cod, haddock, hake, pollock	1,528,344	1,841,424	1,944,089	1,987,327	1,953,498	1,925,076
Croakers	1,447,933	2,094,714	1,845,224	1,713,994	1,441,371	1,184,980
Flounders	659,769	694,459	607,017	625,576	767,434	794,982
Haddock fillets	5,138,820	7,122,631	9,045,126	9,803,217	8,107,031	7,399,797
Halibut (all trade sizes)	7,879,424	9,989,146	12,057,094	11,376,838	11,424,634	10,071,631
Herring, sea (including alewives and bluebacks)	2,421,884	2,886,308	3,412,815	3,957,511	3,678,884	3,461,558
Lake trout	672,771	766,731	815,108	1,016,695	1,814,289	1,810,428
Mackerel (except Spanish)	7,438,372	9,309,497	9,072,763	8,934,788	7,563,259	6,299,571
Pike, blue and sauger	760,790	461,986	513,829	581,059	1,155,164	1,610,341
Pike, yellow or wall-eyed	302,479	254,531	306,607	346,047	449,824	494,028
Pike (including pickerel, jacks, and yellow jack)	351,619	321,135	331,300	351,320	438,755	453,476
Sablefish (black cod)	691,875	891,696	1,481,472	2,093,075	2.223,702	2,007,482
Salmon, chinook	802,225	1,445,897	1,882,030	1,936,320	1,820.559	1,643,879
Salmon, silver	933,071	2,285,669	3,101,538	3,885,910	4,921,814	4.383,446
Salmon, fall and pink	404,009	664,693	719,737	936,494	2,548,189	2,127,538
Salmon, steelhead trout	418,668	843,526	840,090	782,782	702,950	625,466
Salmon, all other	1,573,492	2,605,508	2,734,537	2,840,637	2,814,207	2,664,148
Scup (porgies)	523,160	713,299	828,419	795,070	725,341	573,990
Shad and shad roe	551,884	614,342	718,199	705,777	623,105	611,358
Shellfish	1,730,172	1,916,701	2,033,891	2,225,903	2,542,223	2,502,080
Smelts, eulachon, etc	450,708	443,886	467,266	513,533	489,765	540,857
Squid	3,418,226	3,469,622	3,369,775	2,995,948	2,706,862	2,423,760
Sturgeon and spoonbill cat	1,194,539	1,137,279	772,263	603,503	1,368,960	948,451
Suckers	80,133	135,504	166,772	122,634	131,547	154,792
Weakfish (including southern "sea trout")	1,394,516	1,570,798	1,793,808	2,953,903	3.038,891	2,453,132
Whitefish	1,336,179	1,367,902	1,387,045	1,323,298	1,458,130	1,483,353
Whiting	8,299,137	8,402,266	8,169,802	7,875,726	7,626,829	7,148.268
Miscellaneous fish	9,346,748	11,031,052	11,095,353	11,174,379	11,475,960	11,515.973
Total	64,876,759	78,993,379	85,358,125	88,603,276	91,872,126	85,323,121

Monthly holdings of frozen fishery products, 1930, by geographical sections [1]

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific [2]	Total
January	15,291	16,479	2,407	10,799	4,479	812	12,150	62,417
February	10,451	13,959	1,636	10,147	4,164	751	7,904	49,012
March	6,699	10,462	783	7,511	4,037	646	5,443	35,581
April	2,896	6,881	498	5,212	3,670	569	5,631	25,357
May	6,076	9,068	1,469	5,709	3,571	985	7,261	34,139
June	13,111	11,700	2,317	6,180	3,574	1,020	9,730	47,632
July	22,958	12,881	3,506	6,661	4,010	1,178	13,683	64,877
August	28,375	14,008	4,656	7,211	4,086	1,335	19,322	78,993
September	30,358	14,294	4,496	7,899	4,052	1,235	23,024	85,358
October	29,985	15,988	4,683	8,636	4,395	1,153	23,763	88.603
November	25,983	18,499	4,616	11,593	4,895	1,193	25,093	91,872
December	22,790	17,752	4,779	12,310	4,934	1,155	21,603	85,323
Average	17,914	13,497	2,987	8,322	4,156	1,003	14,551	62,430

[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

[2] Includes a very small amount of fish held in Colorado in the Mountain section.

Monthly holdings of frozen fishery products for 1930 and 1929, and the 5-year average, compared

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	1930	1929	5-year average	Increase (+) or decrease (−)	
				Compared with 1929	Compared with 5-year average
				Per cent	*Per cent*
January	62,417	62,375	55,689	+	+12
February	49,012	48,364	44,669	+1	+10
March	35,581	37,744	32,383	−6	+10
April	25,357	31,687	24,296	−20	+4
May	34,139	30,174	26,353	+13	+30
June	47,632	40,148	36,221	+19	+32
July	64,877	51,664	46,596	+26	+39
August	78,993	64,810	58,027	+22	+36
September	85,358	72,674	64,893	+17	+32
October	88,603	75,864	68,777	+17	+29
November	91,872	79,439	72,158	+16	+27
December	85,323	75,807	69,319	+13	+23
Average	62,430	55,896	49,948	+12	+25

Comparison of the holdings of various important species during the year 1930 with normal (average 1925 to 1929) holdings of these stocks, shows data of interest. With halibut it is found that during each month in 1930 the holdings were below normal except during the months of January, February, November, and December. Those of sea herring were below normal during the first four months of the year, and then above normal for the remainder of the year. Those of lake trout were below normal during the months of January, February, September, October, November, and December. Those of mackerel were above normal for the first three months of the year, then slumped below normal for the next three months, and returned to considerably above normal for the remainder of the year with the exception of November and December, when they were slightly below normal. Those of salmon were somewhat below normal during the first six months of the year, and then during the latter six months holdings increased at an unusual rate. Those of squid were considerably below normal from January to April, inclusive. During this period the shortage of squid for bait became rather acute. However, from May to December the holdings increased and were considerably above normal. The holdings of whiting were considerably above normal every month during the year except during May, when they were practically normal.

Monthly holdings of certain species of frozen fish in 1930 and normal monthly holdings (average 1925–1929)

Species	Month ended the 15th of —											
	January	February	March	April	May	June	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Halibut (all trade sizes):												
Normal	6,802,000	4,305,000	3,222,000	3,213,000	4,623,000	6,674,000	8,438,000	10,698,000	12,109,000	12,207,000	11,062,000	9,622,000
1930	6,870,237	4,586,295	2,823,334	2,927,217	4,317,494	6,099,571	7,879,424	9,989,146	12,057,094	11,376,838	11,424,634	10,071,631
Herring, sea (including alewives and bluebacks):												
Normal	2,998,000	2,814,000	2,601,000	2,033,000	2,203,000	2,197,000	2,125,000	2,237,000	2,429,000	2,695,000	3,096,000	3,165,000
1930	2,429,535	1,503,036	1,448,951	1,487,169	2,229,218	2,338,194	2,421,884	2,886,308	3,412,815	3,957,511	3,678,884	3,461,558
Lake trout:												
Normal	1,742,000	1,335,000	804,000	433,000	419,000	515,000	606,000	765,000	857,000	1,108,000	1,944,000	2,064,000
1930	1,590,515	1,236,050	888,056	576,840	610,1[illegible]3	619,835	672,771	766,731	815,108	1,016,695	1,814,289	1,810,428
Mackerel (except Spanish):												
Normal	4,942,000	3,787,000	2,388,000	1,271,000	1,575,000	3,249,000	5,656,000	7,357,000	8,477,000	8,927,000	8,139,000	6,969,000
1930	6,321,345	4,325,027	2,718,941	766,224	1,303,506	3,198,894	7,438,372	9,309,497	9,072,763	8,934,788	7,563,259	6,299,571
Salmon (all species, including steelhead trout):												
Normal	7,474,000	5,610,000	3,563,000	2,470,000	1,967,000	2,251,000	3,730,000	5,889,000	7,511,000	9,328,000	9,883,000	8,947,000
1930	7,116,256	5,384,602	3,180,513	2,098,998	1,438,164	1,914,419	4,131,465	7,845,293	9,277,932	10,382,143	12,807,719	11,444,477
Squid:												
Normal	1,814,000	1,442,000	1,076,000	591,000	896,000	2,362,000	2,639,000	2,798,000	2,669,000	2,649,000	2,449,000	2,159,000
1930	1,206,275	907,255	430,303	111,275	1,772,719	3,170,893	3,418,226	3,469,622	3,369,775	2,995,948	2,706,862	2,423,760
Whiting:												
Normal	4,376,000	3,080,000	1,861,000	1,249,000	1,028,000	2,517,000	4,994,000	6,586,000	6,444,000	6,040,000	6,215,000	5,941,000
1930	5,177,756	3,636,209	2,398,200	1,399,793	1,013,294	4,964,204	8,299,137	8,402,266	8,169,802	7,875,726	7,626,829	7,148,268

HOLDINGS OF CURED FISH

Only cured herring and mild-cured salmon are reported held in cold-storage warehouses in the United States and Alaska. Other species are also held in cold-storage, but no report is made on them to the Government as their volume reaches but small proportions. During 1930 the monthly holdings of cured herring varied between 12,115,000 pounds in April and 19,067,000 pounds in October. Monthly holdings of mild-cured salmon varied between 2,464,000 pounds in May and 7,516,000 pounds in October. The average monthly holdings of cured fish held in cold-storage in 1930 were 22 per cent less than the average monthly holdings during the year 1929, and 15 per cent below the average normal monthly holdings.

The respective monthly holdings in 1930 compared with the respective monthly holdings in 1929 show decreases of from 8 to 41 per cent. Compared with the respective normal monthly holdings there were decreases of from 10 to 30 per cent.

Holdings of cured fish, 1930, by species and months

Month ended the 15th of—	Cured herring	Mild-cured salmon	Total
	Pounds	*Pounds*	*Pounds*
January	17, 520, 431	4, 286, 020	21, 806, 451
February	15, 257, 876	3, 331, 628	18, 589, 504
March	14, 267, 785	2, 837, 659	17, 105, 444
April	12, 115, 319	2, 716, 761	14, 832, 080
May	14, 691, 268	2, 463, 914	17, 155, 182
June	15, 007, 626	3, 427, 597	18, 435, 223
July	15, 102, 353	4, 968, 906	20, 071, 259
August	14, 980, 533	7, 177, 513	22, 158, 046
September	17, 333, 931	7, 452, 536	24, 786, 467
October	19, 066, 537	7, 516, 202	26, 582, 739
November	17, 391, 127	6, 688, 520	24, 079, 647
December	15, 464, 661	5, 723, 011	21, 187, 672

Monthly holdings of cured fish for 1930 and 1929, and the 5-year average, compared

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	1930	1929	5-year average	Increase (+) or decrease (—)	
				Compared with 1929	Compared with 5-year average
				Per cent	*Per cent*
January	21, 806	23, 659	24, 534	—8	—11
February	18, 590	22, 138	22, 492	—16	—17
March	17, 105	21, 405	20, 317	—20	—16
April	14, 832	25, 181	21, 211	—41	—30
May	17, 155	25, 359	20, 241	—32	—15
June	18, 435	26, 678	21, 495	—31	—14
July	20, 071	28, 342	22, 433	—29	—11
August	22, 158	28, 628	24, 555	—23	—10
September	24, 786	31, 761	28, 183	—22	—12
October	26, 583	30, 748	29, 973	—14	—11
November	24, 080	28, 048	28, 961	—14	—17
December	21, 188	24, 977	27, 583	—15	—23
Average	20, 566	26, 410	24, 332	—22	—15

FOREIGN FISHERY TRADE

The volume of foreign trade in fishery products in the United States in 1930 amounted to $68,105,230 of which $50,829,653 represents the value of those products imported for consumption, and $17,275,577 the value of exports of domestic fishery products. Compared with the previous year, this is a decrease of 25 per cent in the total trade, a decrease of 24 per cent in the value of imports, and a decrease of 28 per cent in the value of exports.

Imports consisted of 338,486,501 pounds of edible products (including fresh, frozen, cured, and canned fish and shellfish), valued at $35,035,999 and nonedible products (comprised mainly of marine animal oils, pearls, imitation pearls, shells and buttons of pearl or shell), valued at $15,793,654. Compared with 1929 this is a decrease of 5 per cent in the quantity and 9 per cent in the value of edible products imported, and a decrease of 43 per cent in the value of nonedible products imported. Decreases in the value of edible products imported were apparent in all classification groups except in the frozen, prepared, or preserved fish roe group wherein there was a small increase. All groups of nonedible products decreased as compared with the previous year.

Fishery exports consisted of edible products amounting to 167,173,475 pounds, valued at $16,983,338 and nonedible products valued at $292,239. Compared with the previous year this is a decrease of 22 per cent in the quantity and 28 per cent in the value of edible products exported and a decrease of 11 per cent in the value of nonedible products exported.

Considering the balance of trade in the various groups of fishery products, the imports of fresh and frozen fish in 1929 were about 20 times the exports, which is practically the same ratio as in the year previous; the imports of salted, dried, smoked, or preserved fish were practically the same as the exports in 1929, whereas the exports were slightly greater in the previous year. The imports of canned and fresh shellfish in 1929 were about 3 times the exports, while in the previous year, they were slightly over twice as much. The exports of other edible fishery products in 1929 were 7 times the imports, which is a considerably larger ratio than in the previous year.

The imports of marine animal oils in 1929 were about 16 times the exports, which is a larger ratio then in the previous year.

Exports of domestic fishery products, 1929 and 1930

Items	1929		1930	
	Quantity	Value	Quantity	Value
Edible fishery products:				
Fish, fresh, frozen or packed in ice—				
Salmon...pounds	3, 582, 174	$545, 575	3, 350, 400	$553, 041
Other fresh fish...do	5, 231, 641	557, 960	4, 852, 885	435, 124
Total...do	8, 813, 815	1, 103, 535	8, 203, 285	988, 165
Fish, salted or dry cured—				
Cod...do	2, 936, 505	367, 477	2, 029, 281	258, 050
Haddock, hake, and pollock...do	1, 246, 856	101, 424	1, 049, 999	80, 833
Herring...do	2, 170, 295	138, 771	1, 298, 701	85, 753
Salmon...do	3, 789, 965	938, 471	1, 695, 819	401, 894
Other...do	1, 697, 913	196, 836	1, 521, 452	146, 109
Total...do	11, 841, 534	1, 742, 979	7, 595, 252	972, 639
Fish, pickled—				
Salmon...do	909, 000	251, 188	888, 400	243, 109
Other...do	852, 000	56, 808	1, 552, 600	85, 075
Total...do	1, 761, 000	307, 996	2, 441, 000	328, 184
Fish, canned—				
Salmon...do	40, 967, 378	7, 405, 941	27, 355, 729	5, 345, 080
Sardines...do	123, 920, 062	9, 418, 511	103, 226, 315	7, 138, 594
Other...do	9, 396, 718	898, 537	1, 336, 260	210, 296
Total...do	174, 284, 158	17, 722, 989	131, 918, 304	12, 693, 970
Shellfish—				
Canned...do	4, 857, 375	1, 006, 896	3, 781, 428	748, 586
Not canned...do	9, 364, 783	1, 405, 785	7, 848, 635	977, 917
Total...do	14, 222, 158	2, 412, 681	11, 630, 063	1, 726, 503
Other fish products...do	2, 386, 079	210, 434	5, 385, 571	273, 877
Total edible products...do	213, 308, 744	23, 500, 614	167, 173, 475	16, 983, 338
Nonedible fishery products:				
Marine-animal oils...do	1, 120, 022	94, 708	1, 079, 181	72, 469
Buttons, pearl or shell...gross	242, 399	82, 915	216, 794	55, 970
Sponges...pounds	124, 443	151, 933	105, 457	163, 800
Total	----------	234, 848	----------	219, 770
Total nonedible products	----------	329, 556	----------	292, 239
Grand total	----------	23, 830, 170	----------	17, 275, 577

Imports of fishery products entered for consumption, 1929 and 1930 [1]

Items	1929		1930					
			January 1 to June 17		June 18 to December 31		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Edible fishery products:								
Fish; fresh, frozen, or packed in ice—								
Cod, haddock, hake, and pollock	1, 036, 046	$67, 408	445, 247	$25, 443	313, 693	$19, 393	758, 940	$44, 836
Eels	501, 536	73, 839	16, 205	1, 740	663, 730	74, 938	679, 935	76, 678
Fresh-water fishes	56, 600, 927	5, 617, 282	23, 704, 430	2, 297, 743	26, 191, 714	2, 250, 239	49, 896, 144	4, 547, 982
Halibut	5, 815, 711	732, 898	1, 910, 480	248, 301	1, 710, 339	188, 480	3, 620, 819	436, 781
Herring:								
Frozen	1, 756, 965	89, 583	788, 088	32, 716	848, 915	32, 234	1, 637, 003	64, 950
Fresh sea	36, 601, 482	251, 549	6, 014, 209	40, 602	21, 149, 003	106, 318	27, 163, 212	146, 920
Mackerel	1, 623, 120	96, 757	415, 366	22, 027	881, 099	49, 073	1, 296, 465	71, 100
Salmon	4, 319, 261	571, 170	2, 109, 576	337, 881	3, 428, 523	433, 936	5, 538, 099	771, 817
Smelts	6, 952, 489	1, 005, 502	3, 164, 227	519, 283	2, 489, 255	347, 241	5, 653, 482	866, 524
Swordfish	723, 821	88, 353	84, 625	6, 641	1, 212, 742	166, 252	1, 297, 367	172, 893
Tuna	50, 695, 484	2, 631, 172	19, 941, 398	994, 290	39, 400, 557	1, 807, 815	59, 341, 955	2, 802, 105
Other dutiable	7, 516, 479	819, 847	5, 120, 422	604, 857	2, 723, 996	379, 855	7, 844, 418	984, 712
Total	174, 143, 321	12, 045, 360	63, 714, 273	5, 131, 524	101, 013, 566	5, 855, 774	164, 727, 839	10, 987, 298
Fish; salted, dried, smoked, pickled, or preserved—								
Cod, dried	28, 012, 786	2, 626, 920	12, 783, 527	1, 149, 776	1, 811, 663	213, 665	14, 595, 190	1, 363, 441
Cod, haddock, hake, pollock, and cusk:								
Pickled or salted	(2)	(2)	(2)	(2)	23, 381, 409	1, 615, 786	23, 381, 409	1, 615, 786
Smoked or kippered	(2)	(2)	(2)	(2)	937, 462	107, 202	937, 462	107, 202
Finnan haddie	1, 056, 106	102, 354	479, 269	49, 703	(3)	(3)	479, 269	49, 703
Haddock, hake, pollock, and cusk, dried	(2)	(2)	(2)	(2)	118, 639	15, 932	118, 639	15, 932
Hake and pollock, dried	1, 586, 030	99, 465	481, 015	31, 349	(3)	(3)	481, 015	31, 349
Herring:								
Dried, smoked, skinned, or boned	402, 674	23, 129	129, 376	10, 107	724, 048	48, 890	853, 424	58, 997
Pickled or salted	44, 163, 702	2, 768, 004	13, 670, 323	819, 613	26, 539, 197	2, 041, 357	40, 209, 520	2, 860, 970
Mackerel, pickled, or salted	7, 883, 422	606, 782	1, 341, 440	94, 855	4, 783, 731	290, 827	6, 125, 171	385, 682
Salmon, dried	1, 460	300	60	24			60	24
Salmon, kippered, smoked, salted, pickled, or otherwise prepared	769, 734	128, 041	290, 961	42, 935	265, 162	24, 103	556, 123	67, 038
Sardines, packed in oil or other substances	31, 389, 716	5, 550, 902	9, 898, 830	1, 762, 985	14, 731, 263	2, 409, 533	24, 630, 093	4, 172, 518
All other, packed in oil or other substances	5, 135, 207	1, 301, 533	2, 292, 754	538, 787	2, 148, 181	514, 416	4, 440, 935	1, 053, 203
Other kippered, smoked, salted, pickled, or otherwise prepared, not elsewhere specified	25, 219, 712	2, 526, 026	8, 816, 045	937, 137	6, 471, 211	683, 351	15, 287, 256	1, 620, 488
Other dried fish	4, 408, 240	615, 867	2, 088, 327	283, 714	1, 622, 351	240, 141	3, 710, 678	523, 855
Others in bulk or packages	992, 899	135, 603	2, 259, 148	279, 117	1, 457, 942	134, 502	3, 717, 090	413, 619
Total	151, 021, 688	16, 484, 926	54, 531, 075	6, 000, 102	84, 992, 259	8, 339, 705	139, 523, 334	14, 339, 807

Fish roe, frozen, prepared, or preserved—								
Caviar	487, 046	793, 360	231, 203	406, 117	357, 041	413, 267	588, 244	819, 384
Other fish roe, preserved	331, 476	65, 308	116, 802	20, 835	104, 480	22, 075	221, 282	42, 910
Total	818, 522	858, 668	348, 005	426, 952	461, 521	435, 342	809, 526	862, 294
Shellfish:								
Crabs	203, 825	16, 415	30, 215	1, 891	12, 713	907	42, 928	2, 798
Crabmeat packed in ice, frozen, or otherwise prepared or preserved	10, 346, 999	4, 646, 504	4, 382, 819	2, 185, 795	5, 955, 707	2, 458, 180	10, 338, 526	4, 643, 975
Lobsters, canned	1, 490, 194	936, 959	502, 702	297, 525	842, 455	458, 704	1, 345, 157	756, 229
Lobsters (other than canned), fresh, frozen, packed in ice, or prepared or preserved in any manner (not specially provided for)	8, 628, 826	2, 231, 298	6, 713, 923	1, 423, 341	3, 117, 306	711, 326	9, 831, 229	2, 134, 667
Turtles	632, 674	33, 396	374, 526	19, 533	344, 157	21, 531	718, 683	41, 064
Other shellfish and shrimp	9, 823, 043	1, 499, 045	5, 742, 196	788, 892	5, 406, 983	478, 975	11, 149, 179	1, 267, 867
Total	31, 125, 561	9, 363, 617	17, 746, 381	4, 716, 977	15, 679, 321	4, 129, 623	33, 425, 702	8, 846, 600
Total edible fishery products	357, 109, 092	38, 752, 571	136, 339, 734	16, 275, 555	202, 146, 667	18, 760, 444	338, 486, 401	35, 035, 999
Nonedible fishery products:								
Marine-animal oils—	*Quantity*		*Quantity*		*Quantity*		*Quantity*	
Cod oil gallons	2, 090, 818	1, 019, 582	1, 016, 211	484, 373	1, 034, 692	433, 238	2, 050, 903	917, 611
Cod-liver oil do	2, 860, 728	2, 448, 162	1, 607, 861	1, 279, 924	1, 287, 106	949, 301	2, 894, 967	2, 229, 225
Herring, menhaden, and sod oil do	4, 628, 428	1, 803, 803	2, 922, 118	1, 107, 852	942, 213	269, 543	3, 864, 331	1, 377, 395
Other fish oils do	465, 859	144, 383	200, 324	48, 366	73, 197	14, 876	273, 521	63, 242
Seal oil do	630, 778	281, 021	294, 083	116, 702	152, 835	62, 994	446, 918	179, 696
Whale oil, sperm do	346, 621	145, 916	180, 240	69, 625	220, 871	80, 949	401, 111	150, 574
Whale oil, other do	7, 540, 329	3, 529, 021	3, 935, 465	1, 708, 694	3, 091, 529	1, 359, 272	7, 026, 994	3, 067, 966
Total do	18, 563, 561	9, 371, 888	10, 156, 302	4, 815, 536	6, 802, 443	3, 170, 173	16, 958, 745	7, 985, 709
Pearls and imitation pearl—								
Pearls and parts, not strung or set		10, 345, 420		530, 640		2, 117, 402		2, 648, 042
Imitation half pearls and hollow or filled pearls, without holes or with holes partly through		68, 655		13, 529		12, 682		26, 211
Imitation solid pearls, wholly or partly pierced, mounted or unmounted		30, 015		28, 409				28, 409
Imitation pearl beads		1, 373, 395		590, 867		323, 305		914, 172
Total		11, 817, 485		1, 163, 445		2, 453, 389		3, 616, 834

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[1] Statistics of imports from January 1 to June 17 are shown separate from those for the period June 18 to December 31, as the tariff act of 1930 was effective on June 18. This act was responsible for numerous changes in classification of fishery products.

[2] Prior to June 18, 1930, these products were included in other classifications.

[3] These products included in other classifications since June 18, 1930.

Imports of fishery products entered for consumption, 1929 and 1930—Continued

Items	1929		1930					
			January 1 to June 17		June 18 to December 31		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Nonedible fishery products—Continued.								
Shells and buttons of pearl or shell—								
Shells, not manufactured:								
Green snail shell pounds	189, 601	$36, 263	105, 502	$16, 193	208, 394	$31, 046	313, 896	$47, 239
Mother-of-pearl do	8, 924, 262	2, 574, 523	2, 729, 152	915, 986	3, 896, 840	1, 247, 601	6, 625, 992	2, 163, 587
All others do	8, 579, 352	306, 490	1, 828, 872	41, 498	1, 232, 166	31, 548	3, 061, 038	73, 046
Shells, manufactured		60, 433		25, 250		17, 463		42, 713
Shell pearl buttons:								
Fresh-water gross	1, 765	1, 057	3, 264	1, 463			3, 264	1, 463
Ocean or trochus do	133, 902	52, 868	70, 502	37, 422	41, 230	14, 710	111, 732	52, 132
Buttons (from Philippine Islands) do	670, 775	365, 694	398, 728	188, 909	436, 913	194, 373	835, 641	383, 282
Total		3, 397, 328		1, 226, 721		1, 536, 741		2, 763, 462
Sponges pounds	856, 515	1, 091, 129	643, 113	697, 511	155, 468	231, 539	798, 581	929, 050
Sponges, manufactures of do			9	94			9	94
Total do	856, 515	1, 091, 129	643, 122	697, 605	155, 468	231, 539	798, 590	929, 144
Agar-agar do	502, 626	405, 728	208, 640	161, 441	200, 283	154, 425	408, 923	315, 866
Ambergris do	387	125, 908	872	16, 683	4	942	876	17, 625
Cuttlefish bone do	361, 707	46, 920	141, 235	17, 823	194, 792	26, 826	336, 027	44, 649
Fish for purposes other than human consumption		62, 560		23, 471		22, 157		45, 628
Fish skins, raw or salted pounds	2, 984, 094	1, 434, 489	452, 831	14, 502	173, 668	15, 854	626, 499	30, 356
Fish sounds, crude, dried, or salted for preservation only do	134, 918	17, 683	10, 032	1, 213	130, 814	7, 445	140, 846	8, 658
Sea grass, eelgrass, and seaweed, dyed or manufactured		38, 350		15, 446		18, 746		34, 197
Whalebone, unmanufactured pounds	3, 154	1, 878	165	20	135	67	300	84
Whalebone, manufactures of		1, 682		48		1, 396		1, 442
Total		2, 135, 198		250, 647		247, 858		498, 505
Total nonedible fishery products		27, 813, 028		8, 153, 954		7, 639, 700		15, 793, 654
Grand total		66, 565, 599		24, 429, 509		26, 400, 144		50, 829, 653

Imports for consumption and domestic exports of fishery products, 1930, and ratio comparisons

Items	Imports		Exports		Ratio of imports to exports	
	Pounds	*Value*	*Pounds*	*Value*	*Quantity*	*Value*
Edible fishery products:						
Fish, fresh, frozen, or packed in ice	164,727,839	$10,987,298	8,203,285	$988,165	201:10	111:10
Fish, salted, dried, smoked, or preserved	139,523,334	14,339,807	141,954,556	13,994,793	10:10	10:10
Shellfish, canned or fresh	33,425,702	8,846,600	11,630,063	1,726,503	29:10	51:10
Other fish products, roe, caviar, etc	809,526	862,294	5,385,571	273,877	10:67	31:10
Total	338,486,401	35,035,999	167,173,475	16,983,338	20:10	21:10
Nonedible fishery products:						
Marine animal oils [1]	127,190,588	7,985,709	8,093,858	72,469	157:10	110:10
All other		7,807,945		219,770		355:10
Total		15,793,654		292,239		540:10
Grand total		50,829,653		17,275,577		29:10

[1] Gallon of marine-animal oil calculated at 7.5 pounds.

FISHERIES OF THE NEW ENGLAND STATES

During 1929 the value of the catch of fishery products in the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) exceeded that in any year for which there are records. This was due mainly to the increased production of haddock. These fisheries gave employment to 17,160 fishermen, or 3 per cent more than in 1928. Of the total number of fishermen employed during 1929, 6,199 regular fishermen were engaged on vessels, and 9,330 regular and 1,631 casual fishermen were employed in the shore and boat fisheries. Their catch amounted to 694,286,086 pounds, valued at $29,072,566. This is an increase of 15 per cent in the catch and 13 per cent in the value of the catch as compared with the quantity and its value for 1928. Of the total catch in 1929, 646,541,278 pounds, valued at $20,881,104, were fish, and 47,744,808 pounds, valued at $8,191,462, were shellfish and miscellaneous products.

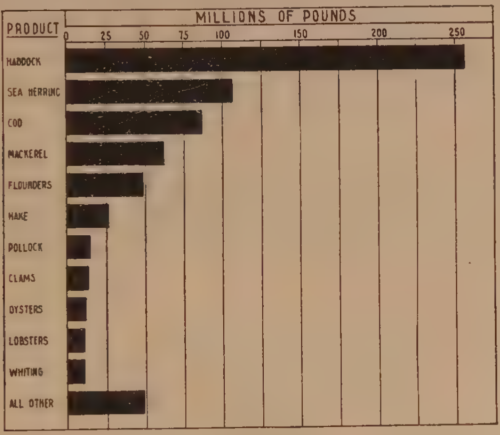

FIGURE 13.—Yield of principal fishery products in the New England States, 1929

Based on the value to the fishermen, haddock with a production of 255,851,532 pounds, valued at $8,950,643, was the most important product. Lobsters were second with a production of 10,322,466 pounds, valued at $3,132,198. Other products of importance were cod, 86,999,326 pounds, valued at $2,919,164; mackerel, 62,272,733 pounds, valued at $2,302,595; flounders, 48,933,312 pounds, valued at $2,145,958; all varieties of clams, 12,575,812 pounds of meats, valued at $1,991,711; and oysters, 11,349,962 pounds of meats, valued at $1,984,251. Other products were valued individually at less than $1,000,000.

The industries related to the fisheries of the New England States gave employment to 13,815 persons, of whom 404 were engaged in transporting fishery products, 3,595 were in the wholesale trade and received $5,285,740 in salaries and wages, 7,872 were in the manufacturing industry and received $3,651,253 in salaries and wages, and 1,944 were fishermen who prepared fishery products and are duplicated in the total number of fishermen employed as shown above. There were 292 establishments in the wholesale trade handling primary products and 162 establishments were in the manufacturing industry. The latter manufactured products—mostly canned sardines, clams, and other canned fishery products—to the value of $15,888,289. In addition, the fishermen prepared fishery products valued at $111,145. Most of these products were salt fish prepared aboard vessel from the various species of ground fish.

Fisheries of the New England States, 1929

SUMMARY OF CATCH

Products	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	148, 799, 469	$2, 337, 561	252, 850	$10, 387	431, 312, 510	$15, 446, 386	20, 747, 438	$974, 045	45, 429, 011	$2, 112, 725	646, 541, 278	$20, 881, 104
Shellfish, etc	14, 140, 022	2, 559, 609	125, 198	41, 684	16, 376, 614	2, 606, 100	7, 653, 830	1, 461. 301	9, 449. 144	1, 522, 768	47, 744. 808	8, 191. 462
Total	162, 939, 491	4, 897, 170	378, 048	52, 071	447, 689, 124	18, 052, 486	28, 401, 268	2, 435, 346	54, 878, 155	3, 635, 493	694, 286, 086	29, 072, 566

Fisheries of the New England States, 1929—Continued

OPERATING UNITS: BY STATES

Items	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	460	-----	4, 537	243	959	6, 199
On boats and shore—						
Regular	4, 555	51	3, 475	852	397	9, 330
Casual	578	-----	390	311	352	1, 631
Total	5, 593	51	8, 402	1, 406	1, 708	17, 160
Vessels:						
Steam	-----	-----	24	-----	31	55
Net tonnage	-----	-----	3, 553	-----	5, 252	8, 805
Motor	79	-----	413	80	99	671
Net tonnage	1, 007	-----	14, 042	917	1, 623	17, 589
Sail	-----	-----	1	-----	4	5
Net tonnage	-----	-----	6	-----	30	36
Total vessels	79	-----	438	80	134	731
Total net tonnage	1, 007	-----	17, 601	917	6, 905	26, 430
Boats:						
Motor	2, 457	38	1, 798	500	300	5, 093
Other	3, 144	39	1, 012	519	492	5, 206
Accessory boats	222	-----	1, 005	40	51	1, 318
Apparatus:						
Purse seines—						
Menhaden	-----	-----	-----	1	2	3
Length, yards	-----	-----	-----	600	480	1, 080
Other	43	1	99	17	16	176
Length, yards	14, 926	600	50, 040	2, 520	2, 960	71, 046
Haul seines, common	108	-----	11	9	92	220
Length, yards	29, 590	-----	1, 970	1, 155	5, 819	38, 534
Gill nets—						
Drift	270	-----	10, 690	200	65	11, 225
Square yards	49, 230	-----	3, 619, 653	99, 600	160, 190	3, 928, 673
Stake	19	-----	-----	-----	1	20
Square yards	1, 700	-----	-----	-----	120	1, 820
Anchor	1, 301	-----	2, 076	-----	21	3, 398
Square yards	215, 858	-----	539, 604	-----	14, 000	769, 462
Runaround	-----	-----	-----	2	-----	2
Square yards	-----	-----	-----	22, 000	-----	22, 000
Lines—						
Trawl	299, 820	240	52, 422	1, 556	588	354, 626
Hooks	1, 987, 200	12, 000	2, 577, 970	72, 640	27, 480	4, 677, 290
Hand	5, 923	100	623	365	436	7, 447
Hooks	6, 804	100	1, 106	2, 348	744	11, 102
Pound nets	2	-----	142	64	22	230
Floating traps	22	-----	14	75	-----	111
Weirs	267	-----	6	-----	-----	273
Fyke nets	93	-----	108	54	123	378
Dip nets	81	-----	58	30	32	201
Bag nets	177	-----	-----	-----	-----	177
Pocket nets	4	-----	-----	-----	-----	4
Otter trawls	30	-----	419	83	124	656
Yards at mouth	866	-----	11, 382	2, 117	3, 273	17, 638
Box traps	11	-----	-----	-----	12	23
Pots—						
Crab	100	-----	2, 490	-----	60	2, 650
Eel	350	-----	1, 572	2, 505	1, 063	5, 490
Lobster	231, 094	2, 814	53, 498	38, 518	19, 900	345, 824
Periwinkle and cockle	-----	-----	490	780	-----	1, 270
Harpoons, swordfish	59	2	107	70	10	248
Spears	15	-----	105	134	60	314
Dredges—						
Oyster	-----	-----	38	30	205	273
Yards at mouth	-----	-----	54	45	244	343
Scallop	117	-----	2, 709	573	-----	3, 399
Yards at mouth	181	-----	2, 307	957	-----	3, 445
Clam	-----	-----	92	2	-----	94
Yards at mouth	-----	-----	48	3	-----	51
Mussel	-----	-----	1	-----	-----	1
Yards at mouth	-----	-----	2	-----	-----	2
Tongs	-----	-----	176	362	98	636
Rakes	-----	-----	407	159	64	630
Forks	1, 282	-----	77	35	-----	1, 394
Hoes	408	-----	481	17	70	976
Grapple irons, kelp	2	-----	-----	-----	-----	2

Fisheries of the New England States, 1929—Continued

CATCH: BY STATES

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2, 820, 947	$20, 097	58, 000	$580	1, 385, 852	$17, 125	119, 389	$2, 137	9, 250	$187	4, 393, 438	$40, 126
Bluefish	495	60	-----	-----	50, 690	7, 011	73, 500	13, 257	219, 048	33, 993	343, 733	54, 321
Bonito	-----	-----	-----	-----	96, 832	6, 821	44, 760	4, 908	1, 805	131	143, 397	11, 860
Butterfish	52, 624	5, 422	-----	-----	800, 176	70, 220	1, 226, 358	139, 272	29, 624	3, 446	2, 108, 782	218, 360
Carp	-----	-----	-----	-----	-----	-----	-----	-----	9, 724	1, 223	9, 724	1, 223
Catfish and bullheads	-----	-----	-----	-----	-----	-----	-----	-----	128	6	128	6
Cod	17, 661, 063	530, 134	3, 600	1, 080	64, 146, 945	2, 172, 341	2, 510, 831	103, 903	2, 676, 887	111, 706	86, 999, 326	2, 919, 164
Crevalle	-----	-----	-----	-----	440	9	-----	-----	-----	-----	440	9
Cunners	1, 735	17	-----	-----	45	2	116, 750	3, 157	-----	-----	118, 530	3, 176
Croaker	-----	-----			-----	-----	-----	-----	44, 535	1, 406	44, 535	1, 406
Cusk	1, 280, 950	28, 156	5, 400	108	3, 642, 765	93, 729	-----	-----	35, 479	357	4, 964, 594	122, 350
Eels	149, 796	14, 400	-----	-----	554, 333	48, 815	421, 386	45, 425	147, 170	16, 817	1, 272, 685	125, 457
Flounders	1, 570, 242	74, 857	1, 250	63	34, 322, 367	1, 519, 873	4, 789, 386	212, 166	8, 250, 067	338, 999	48, 993, 312	2, 145, 958
Frigate mackerel	-----	-----	-----	-----	3, 490	113	-----	-----	-----	-----	3, 490	113
Goosefish	-----	-----	-----	-----	7, 000	45	10, 000	200	-----	-----	17, 000	245
Grayfish	80, 000	800	-----	-----	113, 906	1, 641	19, 400	388	-----	-----	213, 306	2, 829
Haddock	14, 539, 225	445, 404	90, 000	3, 600	212, 880, 770	7, 183, 632	578, 958	21, 619	27, 762, 579	1, 296, 388	255, 851, 532	8, 950, 643
Hake	10, 073, 506	152, 378	32, 400	648	15, 868, 612	435, 632	104, 500	2, 721	292, 747	11, 296	26, 371, 765	602, 675
Halibut	238, 613	36, 788	-----	-----	2, 882, 086	456, 550	-----	-----	132, 346	23, 620	3, 253, 045	516, 958
Herring, sea	91, 860, 394	463, 534	-----	-----	12, 997, 938	196, 684	2, 364, 216	32, 972	-----	-----	107, 222, 548	693, 190
Hickory shad	-----	-----	-----	-----	-----	-----	2, 920	147	-----	-----	2, 920	147
King whiting or "kingfish"	-----	-----	-----	-----	28	3	-----	-----	508	26	536	29
Mackerel	3, 998, 761	156, 033	40, 000	2, 400	54, 236, 264	1, 989, 438	1, 976, 860	95, 110	2, 020, 848	59, 614	62, 272, 733	2, 302, 595
Menhaden	-----	-----	-----	-----	-----	-----	132, 882	1, 336	261, 741	10, 309	394, 623	11, 645
Minnows	-----	-----	-----	-----	3, 000	2, 000	-----	-----	27, 307	7, 486	30, 307	9, 486
Mummichog	-----	-----	-----	-----	-----	-----	-----	-----	3, 720	252	3, 720	252
Pollock	2, 217, 254	39, 537	12, 600	378	11, 578, 518	312, 217	130, 720	3, 886	318, 097	13, 127	14, 257, 189	369, 145
Porpoise	-----	-----	-----	-----	45	1	-----	-----	-----	-----	45	1
Rosefish	3, 947	41	-----	-----	70, 534	1, 354	-----	-----	-----	-----	74, 481	1, 395
Salmon	43, 554	14, 634	-----	-----	100	4	-----	-----	-----	-----	43, 654	14, 638
Scup or porgy	-----	-----	-----	-----	907, 828	45, 219	1, 624, 229	101, 810	385, 882	12, 943	2, 917, 939	159, 972
Sea bass	-----	-----	-----	-----	184, 096	18, 323	71, 660	7, 264	3, 355	460	259, 111	26, 047
Sea robin	-----	-----	-----	-----	-----	-----	254, 549	4, 522	30, 000	250	284, 549	4, 772
Shad	36, 123	3, 190	-----	-----	92, 503	6, 397	15, 253	2, 193	317, 533	31, 451	461, 412	43, 231
Sharks	20, 808	399	-----	-----	25, 832	442	8, 675	171	-----	-----	55, 315	1, 012
Skates	-----	-----	-----	-----	67, 512	2, 009	892, 774	10, 804	295, 970	3, 921	1, 256, 256	16, 734
Skipper or "billfish"	-----	-----	-----	-----	2, 500	575	1, 350	405	-----	-----	3, 850	980
Smelt	852, 280	183, 828	6, 600	1, 320	14, 910	2, 891	11, 940	2, 393	9, 500	1, 650	895, 230	192, 082
Squeteagues	-----	-----	-----	-----	4, 363	687	65, 129	11, 295	92, 886	7, 302	162, 378	19, 284
Striped bass	-----	-----	-----	-----	19, 161	4, 011	22, 585	4, 597	2, 020	367	43, 766	8, 975
Sturgeon	310	31	-----	-----	5, 751	1, 036	500	75	-----	-----	6, 561	1, 142
Suckers	58, 500	2, 850	-----	-----	-----	-----	-----	-----	62, 292	4, 873	120, 792	7, 723

Swellfish							51,200	3,972			51,200	3,972
Swordfish	1,024,880	152,214			4,456,288	681,568	471,975	56,223	115,387	18,492	6,068,530	908,497
Thimble-eyed mackerel					16,355	325					16,355	325
Tautog					174,812	10,999	182,105	11,447	177,461	15,322	534,378	37,768
Tilefish					305,000	18,979			1,671,649	84,737	1,976,649	103,716
Tomcod	16,477	188			6,065	225	900	36	650	98	24,092	547
Tuna or "horse mackerel"	126,851	11,412	3,000	210	44,161	2,537	45,447	4,632	2,568	295	222,027	19,086
White perch					19,600	2,896	1,531	391			21,131	3,287
Whiting	2,820	28			7,871,999	85,791	2,402,820	69,211	500	5	10,278,139	155,035
Wolffish	67,114	1,019			1,451,038	46,216			17,748	170	1,535,900	47,495
Yellow perch	200	20									200	20
Total	148,799,469	2,337,561	252,850	10,387	431,312,510	15,446,386	20,747,438	974,045	45,429,011	2,112,725	646,541,278	20,881,104
SHELLFISH, ETC.												
Crabs:												
Hard	144,000	4,080			4,370,227	100,668	260,068	7,802	174,270	4,149	4,948,565	116,699
Soft									580	145	580	145
Lobsters	6,620,615	1,954,346	125,198	41,684	1,630,531	591,227	1,353,515	341,568	592,607	203,373	10,322,466	3,132,198
Shrimp	17	1			3,000	2,250					3,017	2,251
Squid	18,860	290			3,506,550	63,273	2,100,788	63,667	19,750	574	5,645,948	127,804
Clams:												
Cockle	39,200	3,792			6,300	2,898					45,500	6,690
Hard, public					1,992,488	618,571	1,359,184	429,834	39,400	14,544	3,391,072	1,062,949
Hard, private							56,800	18,850			56,800	18,850
Razor					126,600	15,680					126,600	15,680
Soft, public	6,717,260	472,973			2,110,760	375,830	28,850	8,680	98,970	30,059	8,955,840	887,542
Mussels					10,320	1,219					10,320	1,219
Oysters:												
Market, public							3,500	1,000	75,677	21,005	79,177	22,005
Market, private					379,309	178,311	2,323,377	517,763	3,017,875	486,304	5,720,561	1,182,378
Seed, public									253,918	32,524	253,918	32,524
Seed, private					123,009	17,295			5,173,297	730,049	5,296,306	747,344
Periwinkles	1,500	375			9,000	540	68,800	16,320			79,300	17,235
Scallops:												
Bay					1,498,240	521,950	98,948	55,817			1,597,188	577,767
Sea	358,570	122,552			466,280	107,748					824,850	230,300
Sea urchins									2,800	42	2,800	42
Irish moss					144,000	8,640					144,000	8,640
Kelp	240,000	1,200									240,000	1,200
Total	14,140,022	2,559,609	125,198	41,684	16,376,614	2,606,100	7,653,830	1,461,301	9,449,144	1,522,768	47,744,808	8,191,462
Grand total	162,939,491	4,897,170	378,048	52,071	447,689,124	18,052,486	28,401,268	2,435,346	54,878,155	3,635,493	694,286,086	29,072,566

Fisheries of the New England States, 1929—Continued

PRODUCTION OF CERTAIN SHELLFISH SHOWN IN NUMBERS AND BUSHELS

Products	Maine		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:										
Hard, number	432, 000	$4, 080	13, 110, 681	$100, 668	780, 204	$7, 802	522, 810	$4, 149	14, 845, 695	$116, 699
Soft, do	-------	-------	-------	-------	-------	-------	1, 740	145	1, 740	145
Clams:										
Cockle, bushels	3, 920	3, 792	630	2, 898	-------	-------	-------	-------	4, 550	6, 690
Hard, public, do	-------	-------	249, 061	618, 571	169, 898	429, 834	4, 925	14, 544	423, 884	1, 062, 949
Hard, private, do	-------	-------	-------	-------	7, 100	18, 850	-------	-------	7, 100	18, 850
Razor, do	-------	-------	12, 660	15, 680	-------	-------	-------	-------	12, 660	15, 680
Soft, public, do	671, 726	472, 973	211, 076	375, 830	2, 885	8, 680	9, 897	30, 059	895, 584	887, 542
Mussels, do	-------	-------	1, 032	1, 219	-------	-------	-------	-------	1, 032	1, 219
Oysters:										
Market, public, do	-------	-------	-------	-------	500	1, 000	10, 811	21, 005	11, 311	22, 005
Market, private, do	-------	-------	54, 187	178, 311	331, 911	517, 763	431, 125	486, 304	817, 223	1, 182, 378
Seed, public, do	-------	-------	-------	-------	-------	-------	36, 274	32, 524	36, 274	32, 524
Seed, private, do	-------	-------	17, 573	17, 295	-------	-------	739, 042	730, 049	756, 615	747, 344
Periwinkles, do	150	375	900	540	6, 880	16. 320	-------	-------	7, 930	17, 235
Scallops:										
Bay, do	-------	-------	249, 707	521, 950	16, 491	55, 817	-------	-------	266, 198	577, 767
Sea, do	59, 762	122, 552	77, 713	107, 748	-------	-------	-------	-------	137, 475	230, 300

Industries related to the fisheries of the New England States, 1929

Items	Maine [1]	Massachusetts	Rhode Island	Connecticut	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged on vessels	235	98	61	10	404
Vessels—					
Steam	2	-------	-------	-------	2
Net tonnage	67	-------	-------	-------	67
Motor	117	16	10	5	148
Net tonnage	1, 190	442	202	44	1, 878
Sail	-------	4	-------	-------	4
Net tonnage	-------	443	-------	-------	443
Total vessels	119	20	10	5	154
Total net tonnage	1, 257	885	202	44	2, 388
Wholesale:					
Establishments	91	143	35	23	292
Persons engaged	372	2, 166	440	617	3, 595
Salaries and wages	$447, 299	$3, 512, 992	$399, 713	$925, 736	$5, 285, 740
Manufacturing:					
Establishments	126	36	(2)	(3)	162
Persons engaged	6, 350	1, 522	(2)	(3)	7, 872
Salaries and wages	$1, 672, 971	$1, 978, 282	(2)	(3)	$3, 651, 253
Products	$9, 293, 013	$6, 030, 304	$344, 929	$220, 043	$15, 888, 289
Fishermen's prepared products:					
Persons engaged	429	1, 515	-------	-------	1, 944
Products	$31, 592	$79, 553	-------	-------	$111, 145

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[1] Includes 1 transporter and 2 wholesale firms operating in Rockingham County, N. H.

[2] Statistics relative to persons and compensation for 3 firms which were engaged in manufacturing functions are included under "wholesale." One of these was exclusively a manufacturer and the other 2 manufactured only incidentally.

[3] Statistics relative to persons and compensation for 4 firms which were engaged in manufacturing functions are included under "wholesale." One of these was exclusively a manufacturer and the 3 others manufactured only incidentally.

MAINE

The fisheries and industries related to the fisheries of Maine in 1929, including 1 transporter and 2 wholesale firms in New Hampshire, employed 12,550 persons. This is 35 per cent more than the number employed in these fisheries during 1928. Of the total number of persons, 5,593 were fishermen, 235 were employed on transporting vessels, 372 in the wholesale trade, and 6,350 in manufacturing industries. Of the fishermen 429 also were engaged in the manufacture of prepared fishery products.

The total catch amounted to 162,939,491 pounds, valued at $4,897,170. This is an increase of 32 per cent in the catch and 16 per cent in the value of the catch, as compared with the catch and its value for 1928. Of the total value of the catch, that of lobsters accounted for 40 per cent; cod, 11 per cent; clams, 10 per cent; and haddock and sea herring, each 9 per cent. Of the total weight of the catch, that of sea herring accounted for 56 per cent; cod, 11 per cent; haddock, 9 per cent; hake, 6 per cent; and clams and lobsters, each 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Maine during 1929 was taken by 5,593 fishermen who used 79 motor vessels, 5,601 motor and other small fishing boats, and 20 major types of gear. The vessels had a combined capacity of 1,007 net tons. The fisheries accounting for the greatest number of persons were the lobster-pot fishery employing 2,275 fishermen, the hand-line fishery employing 1,468 fishermen, the fishery with forks employing 1,290 fishermen, and the trawl-line fishery employing 1,092 fishermen.

CATCH BY GEAR

Four types of gear accounted for 83 per cent of the fishery products taken in the marine fisheries of Maine during 1929. Listed in order of their importance they were: Weirs, which accounted for 30 per cent of the catch; lines, 24 per cent; purse seines, 15 per cent; and haul seines, 14 per cent. The catch by weirs was principally herring; that by lines was chiefly haddock, cod, hake, pollock, and cusk; that by purse seines, principally herring and mackerel; and that by haul seines, almost exclusively herring.

OPERATING UNITS BY COUNTIES

Hancock County was foremost in the number of persons fishing, accounting for 31 per cent of the total. Washington County followed with 20 per cent. Other counties employing a considerable number of fishermen were Cumberland, Knox, and Lincoln. Cumberland County accounted for 42 per cent of the total number of fishing vessels, and Knox County followed with 27 per cent. Hancock County led in the number of motor and other small fishing boats, accounting for 26 per cent of the total. Washington followed with 25 per cent.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of 10 counties in Maine during 1929. Ranked according to value the fisheries of Cumberland County were most important, accounting for 21 per cent of the total catch and 24 per cent of the total value of the catch. Knox County was next in the value of the catch accounting for 21 per cent of the total quantity and 20 per cent of the total value. Other important counties listed in order of their importance with respect to the value of the catch were Hancock, Washington, and Lincoln.

Fisheries of Maine, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines	Haul seines	Gill nets			Lines		Pound nets	Floating traps	Weirs
			Anchor	Drift	Stake	Hand	Trawl			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	128	42	49	19	----	17	225	----	----	----
On boats and shore—										
Regular	80	167	128	40	3	989	867	2	35	318
Casual	----	16	8	2	1	462	----	----	----	50
Total	208	225	185	61	4	1,468	1,092	2	35	368
Vessels:										
Motor—										
5 to 10 tons	17	5	7	1	----	6	10	----	----	----
11 to 20 tons	8	3	3	2	----	----	8	----	----	----
21 to 30 tons	----	----	----	----	----	----	2	----	----	----
31 to 40 tons	----	----	----	----	----	----	2	----	----	----
41 to 50 tons	----	1	----	----	----	----	1	----	----	----
51 to 60 tons	----	----	----	----	----	----	2	----	----	----
Total	25	9	10	3	----	6	25	----	----	----
Net tonnage	235	128	93	42	----	44	488	----	----	----
Boats:										
Motor	19	57	67	26	----	357	724	1	16	169
Other	32	110	97	75	4	379	973	2	27	298
Accessory boats	36	14	----	----	----	6	172	----	----	----
Apparatus:										
Number	43	108	1,301	270	19	5,923	299,820	2	22	267
Length, yards	14,926	29,590	----	----	----	----	----	----	----	----
Square yards	----	----	215,858	49,230	1,700	----	----	----	----	----
Hooks, baits, or snoods	----	----	----	----	----	6,804	1,987,200	----	----	----

Items	Fyke nets	Dip nets	Bag nets	Pocket nets	Otter trawls	Box traps	Pots		
							Crab	Eel	Lobster
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	----	----	----	----	43	----	----	----	12
On boats and shore—									
Regular	9	46	79	2	38	7	3	24	2,263
Casual	5	35	26	----	----	----	----	2	----
Total	14	81	105	2	81	7	3	26	2,275
Vessels:									
Motor—									
5 to 10 tons	----	----	----	----	7	----	----	----	4
11 to 20 tons	----	----	----	----	3	----	----	----	----
Total	----	----	----	----	10	----	----	----	4
Net tonnage	----	----	----	----	91	----	----	----	28
Boats:									
Motor	3	2	17	1	20	----	2	8	1,957
Other	11	4	62	1	22	1	2	20	1,967
Apparatus:									
Number	93	81	177	4	30	11	100	350	231,094
Yards at mouth	----	----	----	----	866	----	----	----	----

Fisheries of Maine, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Harpoons	Spears	Dredges, scallop	Forks	Hoes	Grapple irons	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	178		21					460
On boats and shore—								
Regular	86	8	136	1, 290	398	2	5	4, 555
Casual		7						578
Total	264	15	157	1, 290	398	2	5	5, 593
Vessels:								
Motor—								
5 to 10 tons	3		4					49
11 to 20 tons	6		2					22
21 to 30 tons	2							2
31 to 40 tons	2							2
41 to 50 tons	1							2
51 to 60 tons	2							2
Total	16		6					79
Net tonnage	403		60					1, 007
Boats:								
Motor	42	1	93	145	42	1		2, 457
Other	46	13	87	568	311	1		3, 144
Accessory boats	59							222
Apparatus:								
Number	59	15	117	1, 282	408	2		
Yards at mouth			181					

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets					
					Anchor		Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	572, 517	$9, 806			210, 000	$650	3, 000	$90		
Butterfish	1, 520	278								
Cod					3, 147, 681	108, 815				
Cusk					8, 402	176				
Flounders					34, 054	1, 643				
Haddock					840, 789	26, 497				
Hake					237, 398	4, 784				
Halibut					411	84				
Herring, sea	20, 588, 887	114, 502	22, 558, 942	$122, 270						
Mackerel	2, 267, 782	84, 524	673, 606	26, 943			435, 906	17, 373		
Pollock	205, 027	4, 101			641, 882	13, 562				
Salmon					5, 272	1, 877			5, 450	$1, 907
Shad	16, 357	1, 386			3, 570	259	700	110		
Sharks					12, 790	240				
Smelt	3, 340	835	216, 801	40, 066	48, 781	10, 438			1, 000	200
Sturgeon							160	16		
Tomcod			1, 477	38						
Wolffish					368	5				
Lobsters					5	2				
Total	23, 655, 430	215, 432	23, 450, 826	189, 317	5, 191, 403	169, 032	439, 766	17, 589	6, 450	2, 107

Fisheries of Maine, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pounds nets		Floating traps	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							1, 000	$17
Bluefish							495	60
Butterfish					1, 000	$100	48, 764	4, 910
Cod	2, 720, 443	$80, 048	10, 862, 343	$319, 084				
Cusk	16, 825	310	1, 226, 311	27, 165				
Flounders			56, 718	2, 575			29, 776	1, 488
Grayfish			80, 000	800				
Haddock	813, 703	21, 188	11, 683, 078	373, 369				
Hake	501, 831	8, 105	8, 698, 065	131, 201				
Halibut	17, 530	2, 917	220, 630	33, 781				
Herring, sea					267, 897	1, 339	244, 034	2, 320
Mackerel					22, 559	902	529, 688	22, 834
Pollock	665, 475	10, 765	699, 437	11, 011				
Rosefish			3, 947	41				
Salmon					200	50	2, 060	544
Shad							14, 886	1, 401
Sharks			2, 563	51			5, 330	105
Smelt	389, 623	93, 458			2, 000	400	1, 178	236
Whiting							2, 820	28
Wolffish			65, 298	1, 063				
Squid							18, 860	290
Total	5, 125, 430	216, 791	33, 598, 390	900, 141	293, 656	2, 791	898, 891	34, 233

Species	Weirs		Fyke nets		Dip nets		Bag nets		Pocket nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1, 146, 821	$4, 912			880, 351	$3, 849				
Butterfish	1, 340	134								
Cunners					1, 735	17				
Eels			2, 500	$300	1, 000	100				
Herring, sea	48, 200, 634	223, 103								
Mackerel	69, 220	3, 457								
Salmon	30, 572	10, 256								
Shad	610	34								
Sharks	125	3								
Smelt	7, 800	1, 604			32, 600	6, 520	147, 907	$29, 821	1, 250	$250
Sturgeon	150	15								
Suckers			58, 500	2, 850						
Tomcod							15, 000	150		
Yellow perch			200	20						
Total	49, 457, 272	243, 518	61, 200	3, 170	915, 686	10, 486	162, 907	29, 971	1, 250	250

Species	Otter trawls		Box traps		Pots			
					Crab		Eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7, 258	$773						
Cod	930, 596	22, 187						
Cusk	29, 412	505						
Eels			22, 750	$3, 358			113, 646	$9, 232
Flounders	1, 449, 694	69, 151						
Haddock	1, 201, 655	24, 350						
Hake	636, 212	8, 288						
Halibut	42	6						
Pollock	5, 433	98						
Wolffish	1, 448	41						
Crabs, hard					70, 000	$1, 600		
Lobsters	4	2						
Shrimp	17	1						
Total	4, 261, 771	125, 402	22, 750	3, 358	70, 000	1, 600	113, 646	9, 232

Fisheries of Maine, 1929—Continued

CATCH: BY GEAR—Continued

Species	Pots		Harpoons		Spears		Dredges, scallop	
	Lobster							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels					9,900	$1,410		
Swordfish			1,024,880	$152,214				
Tuna or "horse mackerel"			126,851	11,412				
Crabs, hard	74,000	$2,480						
Lobsters	6,620,606	1,954,342						
Scallops, sea							358,570	$122,552
Total	6,694,606	1,956,822	1,151,731	163,626	9,900	1,410	358,570	122,552

Species	Forks		Hoes		Grapple irons		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Cockle			36,000	3,600			3,200	192
Soft	4,594,500	263,397	2,122,760	209,576				
Periwinkles							1,500	375
Kelp					240,000	1,200		
Total	4,594,500	263,397	2,158,760	213,176	240,000	1,200	4,700	567

OPERATING UNITS: BY COUNTIES

Items	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	261	17		83	62			4	29	4
On boats and shore—										
Regular	512	1,648	3	552	330	13	167	70	1,071	189
Casual		73		129	163		170	32	11	
Total	773	1,738	3	764	555	13	337	106	1,111	193
Vessels:										
Motor—										
5 to 10 tons	16	3		16	10			1	3	
11 to 20 tons	10	1		5	2				3	1
21 to 30 tons	2									
31 to 40 tons	2									
41 to 50 tons	1								1	
51 to 60 tons	2									
Total	33	4		21	12			1	7	1
Net tonnage	558	36		187	101			7	106	12
Boats:										
Motor	367	652	1	389	193	1	88	14	644	108
Other	437	830	3	474	258	13	160	49	773	147
Accessory boats	160	8		22	23			1	8	
Apparatus:										
Purse seines	6	8		7	15			1	4	2
Length, yards	1,660	3,840		2,196	4,570			300	2,000	360
Haul seines	57	7		21	12		4		6	1
Length, yards	13,320	740		10,700	1,980		840		1,880	130
Gill nets—										
Anchor	519	75		4	266	55		57	144	181
Square yards	96,420	13,500		2,820	47,880	5,500		5,200	14,550	29,988
Drift	183	24		14	5				6	38
Square yards	32,940	4,320		2,100	1,950				1,080	6,840
Stake		4				15				
Square yards		200				1,500				
Lines—										
Hand	44	3,326		626	836		719	108	232	32
Hooks	44	3,449		692	884		739	500	464	32
Trawl	11,870	269,000		6,320	2,630		2,290	40	5,860	1,810
Hooks	593,500	455,200		316,000	131,500		114,500	2,000	293,000	81,500
Pounds nets	2									
Floating traps	14				2		6			
Weirs	1	75		27	9	3	8	24	120	

Fisheries of Maine, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Apparatus—Continued.										
Fyke nets			22		26		45			
Dip nets	1	4		15	8		2	12	39	
Bag nets		32				2	9	55	79	
Pocket nets									4	
Otter trawls	14	7		6	1		1			1
Yards at mouth	388	193		200	35		25			25
Box traps		4		7						
Pots—										
Crab				60	40					
Eel	45	25		30	1	24	135	30		60
Lobster	27, 698	51, 250		62, 278	19, 893		3, 938	119	54, 320	8, 598
Harpoons	30	1		1	11		8			
Spears		2		5	7		1			
Dredges, scallop	16	59		29					13	
Yards at mouth	32	79		53					17	
Forks		599		113	137		49	2	382	
Hoes	251						37			120
Grapple irons				2						

CATCH: BY COUNTIES

Species	Cumberland		Hancock		Kennebec	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	17, 258	$955	361, 972	$2, 640		
Bluefish	495	60				
Butterfish	31, 954	3, 196				
Cod	4, 873, 281	172, 944	3, 132, 069	67, 645		
Cunners	1, 735	17				
Cusk	812, 331	20, 628	252, 111	3, 681		
Eels	12, 000	1, 200	31, 100	3, 483	500	$50
Flounders	584, 595	24, 417	352, 965	19, 412		
Haddock	5, 574, 770	217, 703	3, 277, 998	55, 412		
Hake	3, 142, 552	65, 829	3, 737, 658	39, 423		
Halibut	73, 160	10, 506	44, 067	7, 622		
Herring, sea	13, 032, 028	77, 016	11, 504, 600	59, 368		
Mackerel	1, 880, 689	71, 103	63, 865	2, 555		
Pollock	986, 446	19, 981	532, 487	6, 004		
Rosefish	3, 947	41				
Salmon	1, 175	293	16, 060	5, 772		
Shad	20, 063	1, 764				
Sharks	20, 658	396				
Smelt	93, 879	18, 777	348, 290	83, 580		
Suckers					30, 000	1, 320
Swordfish	850, 970	124, 544	101, 185	14, 504		
Tomcod	1, 477	38				
Tuna or "horse mackerel"	63, 820	3, 830				
Whiting	2, 820	28				
Wolffish	52, 427	922				
Crabs, hard	58, 000	2, 320	6, 000	60		
Lobsters	827, 298	211, 578	1, 523, 978	458, 794		
Squid	8, 860	178				
Clams:						
Cockle	36, 000	3, 600				
Soft	1, 264, 270	126, 427	1, 373, 000	92, 350		
Scallops, sea	23, 842	11, 871	120, 300	47, 275		
Total	34, 352, 800	1, 192, 162	26, 779, 705	969, 580	30, 500	1, 370

Fisheries of Maine, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Knox		Lincoln		Penobscot	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1, 121, 000	$3, 989	759, 467	$9, 820		
Butterfish			18, 720	1, 868		
Cod	4, 565, 172	132, 412	1, 735, 404	51, 582		
Cusk	131, 612	2, 210	14, 506	220		
Eels	11, 800	1, 778	6, 000	900	11, 016	$551
Flounders	504, 781	24, 485	46, 401	3, 123		
Grayfish	80, 000	800				
Haddock	3, 287, 376	99, 282	337, 321	10, 083		
Hake	1, 782, 556	21, 432	329, 804	6, 487		
Halibut	17, 781	2, 700	6, 000	958		
Herring, sea	18, 995, 810	92, 978	7, 395, 700	47, 287		
Mackerel	82, 350	4, 157	1, 516, 937	57, 133		
Pollock	364, 306	5, 478	41, 780	836		
Salmon			1, 100	305	9, 107	3, 187
Shad			10, 260	1, 066		
Sharks	150	3				
Smelt	133, 750	22, 700	59, 213	12, 386	7, 475	1, 366
Sturgeon			310	31		
Suckers			3, 500	350		
Swordfish	72, 725	13, 166				
Tuna or "horse mackerel"			29, 500	5, 570		
Wolffish	13, 180	157	182	3		
Yellow perch			200	20		
Crabs, hard	20, 000	600	50, 000	1, 000		
Lobsters	1, 543, 136	463, 561	576, 329	173, 621		
Shrimp			17	1		
Squid			10, 000	112		
Clams: Soft	403, 900	26, 285	407, 400	27, 683		
Scallops, sea	209, 028	60, 706				
Kelp	240, 000	1, 200				
Total	33, 580, 413	980, 080	13, 466, 051	412, 445	27, 598	5, 104

Species	Sagadahoc		Waldo		Washington		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	40, 500	$294			410, 500	$1, 296	110, 250	$1, 103
Butterfish	650	98					1, 300	260
Cod	1, 578, 330	47, 350	31, 000	$1, 230	1, 178, 557	39, 932	567, 250	17, 038
Cusk	21, 150	423			38, 340	783	10, 900	211
Eels	37, 100	3, 910	30, 000	1, 500	1, 000	100	9, 280	928
Flounders	10, 000	500					71, 500	2, 920
Haddock	767, 665	22, 876	23, 600	914	531, 745	17, 271	738, 750	21, 863
Hake	503, 330	9, 989	16, 650	500	423, 556	8, 188	27, 400	530
Halibut	5, 800	928			88, 780	13, 625	3, 025	449
Herring, sea	701, 667	9, 415	3, 975, 865	19, 880	36, 254, 724	157, 590		
Mackerel	199, 300	10, 204	65, 620	3, 281			190, 000	7, 600
Pollock	66, 410	1, 318			210, 675	5, 607	15, 150	313
Salmon			14, 872	4, 600	1, 240	477		
Shad					800	110	5, 000	250
Smelt	47, 550	12, 075	99, 123	19, 274	57, 000	12, 170	6, 000	1, 500
Suckers	25, 000	1, 180						
Tomcod			15, 000	150				
Tuna or "horse mackerel"	24, 531	1, 472					9, 000	540
Wolffish							1, 325	27
Crabs, hard					10, 000	100		
Lobsters	169, 177	52, 765	2, 638	815	1, 645, 905	497, 182	332, 154	96, 030
Clams:								
Cockle					3, 200	192		
Soft	397, 840	27, 286	4, 000	400	2, 120, 000	97, 857	746, 850	74, 685
Periwinkles					1, 500	375		
Scallops, sea					5, 400	2, 700		
Total	4, 596, 000	202, 083	4, 278, 368	52, 544	42, 982, 922	855, 555	2, 845, 134	226, 247

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 235 persons in Maine engaged primarily in transporting fishery products by means of vessels. In this trade 2 steam vessels and 117 motor vessels, having a combined capacity of 1,257 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 91 wholesale establishments in Maine engaged primarily in handling fresh and frozen products. These establishments employed 372 persons, who received $447,299 in salaries and wages. Knox County alone accounted for 28 of these establishments.

Manufacturing.—There were 126 establishments in Maine in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 6,350 persons, who received $1,672,971 in salaries and wages. The products manufactured, consisting principally of salted, smoked, and canned fishery products, were valued at $9,293,013. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095 entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were 429 fishermen in Maine who prepared fishery products. Their output consisted principally of salted and smoked fish amounting to 914,349 pounds, valued at $31,592.

Industries related to the fisheries of Maine, 1929

TRANSPORTING [1]

Items	Number
Persons engaged on transporting vessels	235
Transporting vessels:	
Steam—	
21 to 30 tons	1
41 to 50 tons	1
Total	2
Net tonnage	67
Motor—	
5 to 10 tons	71
11 to 20 tons	41
Transporting vessels—Continued.	
Motor—Continued.	
21 to 30 tons	4
31 to 40 tons	1
Total	117
Net tonnage	1,190
Total vessels	119
Total net tonnage	1,257

WHOLESALE [2]

Items	Cumberland County	Hancock County	Knox County	Lincoln [2] County	Washington County	Total
Establishments	14	19	28	9	21	91
Persons engaged:						
Proprietors	19	19	29	13	24	104
Salaried employees	17		9	1		27
Wage earners	142	9	41	21	28	241
Paid to salaried employees	$63,908	$8,000	$62,761	$12,580		$147,249
Paid to wage earners	208,505	10,360	40,722	22,539	$17,924	300,050
Total salaries and wages	272,413	18,360	103,483	35,119	17,924	447,299

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[1] Includes 1 transporter operated from Rockingham County, N. H.

[2] Includes 2 firms in Rockingham County, N. H.

Industries related to the fisheries of Maine, 1929—Continued

MANUFACTURING [3]

Items	Number	Products [4]	Quantity	Value
Establishments	126	Salted....pounds	9,426,711	$438,665
Persons engaged:		Smoked [3]....do	5,866,295	536,456
Proprietors	174	Canned:		
Salaried employees	109	Sardines....standard cases [5]	2,002,801	6,817,446
Wage earners	6,067	Clam products....do	201,102	724,318
Paid to salaried employees	$277,640	Miscellaneous fishery products....standard cases	48,218	443,091
Paid to wage earners	1,395,331	By-products:		
		Scrap, meal, etc....tons	7,386	201,542
Total salaries and wages	1,672,971	Herring oil....gallons	150,255	53,708
		Cod-liver oil, crude....do	52,037	37,558
		Other products [6]		40,229
		Total		9,293,013

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value	Items	Quantity	Value
Fishermen engaged....number	429		Salted products—Continued.		
			Mackerel....pounds	4,550	$91
Salted products:			Pollock....do	3,796	106
Alewives....pounds	281,500	$9,815	Smoked products: Alewives....pounds	476,000	14,455
Cod....do	119,189	6,000	By-products: Fish-waste....do	1,300	14
Cusk....do	2,789	86			
Haddock....do	5,333	179	Total	914,349	31,592
Hake....do	14,672	585			
Herring....do	5,220	261			

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[3] Includes a small quantity of fish smoked in Rockingham County, N. H.

[4] Includes the production of 11 firms whose activities were principally in the wholesale industry.

[5] A standard case contains one hundred ¼-pound cans of sardines, 48 No. 1 cans of clam products, or forty-eight 1-pound cans of miscellaneous fishery products.

[6] Includes dried sounds, herring skins, and scales, tanners oil, and kelp products.

NEW HAMPSHIRE

The fisheries of New Hampshire in 1929 employed 51 persons, which is 4 per cent less than the number employed in 1928. Only 1 transporter and 2 wholesale plants were operated in this State; therefore the vessel and the number of persons engaged, salaries and wages, and products of these establishments are included under Maine. The entire number of persons shown above were fishermen.

The total catch amounted to 378,048 pounds, valued at $52,071. This is an increase of 58 per cent in the catch and 16 per cent in the value of the catch, as compared with the catch and its value in 1928. Of the total value of the catch, lobsters accounted for 80 per cent and haddock 7 per cent. Of the total weight of the catch, lobsters accounted for 33 per cent; haddock, 24 per cent; and alewives, 15 per cent. The fisheries of New Hampshire are confined to Rockingham County.

OPERATING UNITS BY GEAR

The catch of fishery products in the marine waters of New Hampshire during 1929 was taken by 51 fishermen, 77 motor and other small fishing boats, and 4 major types of gear. The lobster pot fishery alone accounted for 41 of the fishermen.

CATCH BY GEAR

Two types of gear accounted for 73 per cent of the fishery products taken in the marine fisheries of New Hampshire during 1929. Of these gears, lines were the most important, accounting for 40 per cent of the catch. Lobster pots followed with 33 per cent. The catch by lines was principally cod, haddock, hake, and pollock, and that by lobster pots was exclusively lobsters.

Fisheries of New Hampshire, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines	Lines		Pots, lobster	Harpoons	Total, exclusive of duplication
		Hand	Trawl			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore—Regular	7	25	6	41	4	51
Boats:						
Motor	1		6	37	2	38
Other	1		6	38	2	39
Apparatus:						
Number	1	100	240	2,814	2	
Length, yards	600					
Hooks, baits or snoods		100	12,000			

CATCH: BY GEAR

Species	Purse seines		Lines				Pots, lobster		Harpoons	
			Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	58,000	$580								
Cod					3,600	$1,080				
Cusk					5,400	108				
Flounders					1,250	63				
Haddock					90,000	3,600				
Hake					32,400	648				
Mackerel	40,000	2,400								
Pollock					12,600	378				
Smelt			6,600	$1,320						
Tuna									3,000	$210
Lobsters							125,198	$41,684		
Total	98,000	2,980	6,600	1,320	145,250	5,877	125,198	41,684	3,000	210

MASSACHUSETTS

The fisheries and industries related to the fisheries of Massachusetts in 1929 employed 12,188 persons, which is 11 per cent more than the number employed in 1928. Of the total number of persons, 8,402 were fishermen, 98 were employed on transporting vessels, 2,166 in the wholesale trade, and 1,522 in manufacturing industries. Of the fishermen, 1,515 were also engaged in the manufature of prepared fishery products.

The total catch amounted to 447,689,124 pounds valued at $18,052,486. This is an increase of 18 per cent in the catch and 15 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of haddock accounted for 40 per cent; cod, 12 per cent; mackerel, 11 per cent; and flounders, 8 per cent. Of the total weight of the catch, that of haddock accounted for 48 per cent; cod, 14 per cent; mackerel, 12 per cent; and flounders, 8 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Massachusetts during 1929 was taken by 8,402 fishermen, who used 413 motor vessels, 1 sailing vessel, 24 steam vessels, 2,810 motor and other small fishing boats, and 19 major types of gear. The vessels had a combined capacity of 17,601 net tons. The fisheries accounting for the greatest number of persons were the otter-trawl fishery, employing 2,967 fishermen; the trawl-line fishery, employing 1,661 fishermen; the harpoon fishery, employing 1,140 fishermen; and the purse-seine fishery, employing 1,017 fishermen.

CATCH BY GEAR

Three types of gear accounted for 86 per cent of the fishery products taken in the marine fisheries of Massachusetts during 1929. Listed in order of their importance they were: Otter trawls, which accounted for 54 per cent of the catch; lines, 22 per cent; and purse seines, 10 per cent. The catch by otter trawls and lines was principally fish of the ground-fish group, and that by purse seines was principally mackerel.

OPERATING UNITS BY COUNTIES

Suffolk County was foremost in the number of persons fishing, accounting for 31 per cent of the total. Essex County followed with 29 per cent. Other counties employing a considerable number of fishermen were Barnstable, Bristol, and Plymouth. Suffolk County accounted for 42 per cent of the total number of fishing vessels, and Essex County followed with 33 per cent. Barnstable County led in the number of motor and other small fishing boats, accounting for 33 per cent of the total. Essex and Plymouth Counties followed in order, accounting for 18 per cent and 17 per cent, respectively, of the total number.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of 8 counties in Massachusetts during 1929. Ranked according to value, the fisheries of Suffolk were most important, accounting for 53 per cent of the total catch and 45 per cent of the total value of the catch. Essex County was next in the value of the catch, accounting for 29 per cent each of the total quantity and value. Other important counties, listed in order of their importance with respect to the value of the catch, were Barnstable and Bristol.

Fisheries of Massachusetts, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines	Haul seines	Gill nets		Lines		Pound nets	Floating traps	Weirs
			Anchor	Drift	Hand	Trawl			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	981		177	620	279	1, 131			
On boats and shore—									
Regular	30	31	60	270	157	529	212	34	8
Casual	6	6	2	2	33	1			
Total	1, 017	37	239	892	469	1, 661	212	34	8
Vessels:									
Motor—									
5 to 10 tons	7		7	11	4	1			
11 to 20 tons	35		9	46	6	7			
21 to 30 tons	15		5	12		1			
31 to 40 tons	6			3		3			
41 to 50 tons	7			1	2	3			
51 to 60 tons	10		1	3	4	10			
61 to 70 tons	5				1	18			
71 to 80 tons	1				2	7			
81 to 90 tons	1				1	1			
91 to 100 tons	2					1			
111 to 120 tons						2			
121 to 130 tons						1			
131 to 140 tons						1			
Total	89		22	76	20	56			
Net tonnage	2, 737		374	1, 377	734	3, 297			
Sail—									
5 to 10 tons					1				
Net tonnage					6				
Total vessels	89		22	76	21	56			
Total net tonnage	2, 737		374	1, 377	740	3, 297			
Boats:									
Motor	10	6	31	100	104	214	63	16	2
Other	18	13	23	24	23	24	78	12	5
Accessory boats	188		20	147	86	558			
Apparatus:									
Number	99	11	2, 076	10, 690	623	52, 422	142	14	6
Length, yards	50, 040	1, 970							
Square yards			539, 604	3, 619, 653					
Hooks, baits or snoods					1, 106	2, 577, 970			

Fisheries of Massachusetts, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Fyke nets	Dip nets	Push nets	Otter trawls	Pots				Harpoons
					Crab	Eel	Lobster	Periwinkle and cockle	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				2, 550			8		1, 138
On boats and shore—									
Regular	32	78	45	414	35	41	677	7	2
Casual	10	27	10	3		18	36	3	
Total	42	105	55	2, 967	35	59	721	10	1, 140
Vessels:									
Motor—									
5 to 10 tons				36			4		13
11 to 20 tons				98			1		36
21 to 30 tons				24					10
31 to 40 tons				13					3
41 to 50 tons				14					5
51 to 60 tons				24					20
61 to 70 tons				10					9
71 to 80 tons				5					4
81 to 90 tons				1					1
91 to 100 tons				7					1
101 to 110 tons				4					
111 to 120 tons				7					2
131 to 140 tons									1
151 to 160 tons				1					
171 to 180 tons				2					
201 to 210 tons				1					
Total				247			5		105
Net tonnage				8, 472			35		3, 770
Steam—									
91 to 100 tons				6					
111 to 120 tons				6					
121 to 130 tons				1					
131 to 140 tons				1					
151 to 160 tons				1					
161 to 170 tons				1					
171 to 180 tons				2					
181 to 190 tons				1					
201 to 210 tons				1					
211 to 220 tons				2					
241 to 250 tons				1					
261 to 270 tons				1					
Total				24					
Net tonnage				3, 553					
Total vessels				271			5		105
Total net tonnage				12, 025			35		3, 770
Boats:									
Motor	8	27		146	35	25	632	7	2
Other	25	7	55			30	141		
Accessory boats							1		226
Apparatus:									
Number	108	58	55	419	2, 490	1, 572	53, 498	490	107
Yards at mouth				11, 382					

Fisheries of Massachusetts, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Spears	Dredges				Tongs	Rakes	Forks	Hoes	Total, exclusive of duplication
		Clam	Mussel	Oyster	Scallop					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels		42		13	76		3			4,537
On boats and shore—										
Regular	81	126	3	28	837	168	379	58	328	3,475
Casual	24				94	8	26	19	154	390
Total	105	168	3	41	1,007	176	408	77	482	8,402
Vessels:										
Motor—										
5 to 10 tons		8		3	8		2			68
11 to 20 tons		6		2	4					149
21 to 30 tons					1					42
31 to 40 tons					1					19
41 to 50 tons										21
51 to 60 tons										41
61 to 70 tons										28
71 to 80 tons										14
81 to 90 tons										3
91 to 100 tons										9
101 to 110 tons										4
111 to 120 tons										9
121 to 130 tons										1
131 to 140 tons										1
151 to 160 tons										1
171 to 180 tons										2
201 to 210 tons										1
Total		14		5	14		2			413
Net tonnage		128		54	179		11			14,042
Sail—										
5 to 10 tons										1
Net tonnage										6
Steam—										
91 to 100 tons										6
111 to 120 tons										6
121 to 130 tons										1
131 to 140 tons										1
151 to 160 tons										1
161 to 170 tons										1
171 to 180 tons										2
181 to 190 tons										1
201 to 210 tons										1
211 to 220 tons										2
241 to 250 tons										1
261 to 270 tons										1
Total										24
Net tonnage										3,553
Total vessels		14		5	14		2			438
Total net tonnage		128		54	179		11			17,601
Boats:										
Motor		77	1	11	610	18	119	3	66	1,798
Other	43			1	7	159	244	34	248	1,012
Accessory boats										1,005
Apparatus:										
Number	105	92	1	38	2,709	176	407	77	481	
Yards at mouth		48	2	54	2,307					

Fisheries of Massachusetts, 1929—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	413, 610	$5, 892	582, 375	$6, 753	77, 000	$1, 092	19, 600	$147
Bluefish							1, 090	228
Bonito					1, 200	100		
Butterfish	36, 890	2, 946			3, 655	173	37, 684	3, 028
Cod	1, 331	36	1, 430	52	4, 174, 271	192, 382	169, 535	8, 131
Cusk					1, 698	34	368	7
Eels	160, 000	2, 400	13, 900	2, 135				
Flounders					98, 785	4, 277	15, 240	416
Grayfish							4, 900	103
Haddock	297	5			1, 686, 950	53, 394	220, 638	5, 593
Hake					340, 152	9, 093	38, 538	1, 194
Halibut					493	84		
Herring, sea	1, 604, 598	35, 681	60, 000	1, 200			551, 820	13, 956
Mackerel	44, 119, 436	1, 607, 198	10, 500	525	304, 645	11, 304	7, 015, 587	266, 409
Pollock					4, 786, 693	85, 814	754, 827	16, 013
Shad	840	42	10, 700	1, 070	44, 994	2, 986	23, 750	1, 552
Sharks					14, 028	312		
Striped bass			15, 471	3, 106				
Sturgeon					948	208		
White perch			19, 600	2, 896				
Wolffish					8, 743	476		
Total	46, 337, 002	1, 654, 200	713, 976	17, 737	11, 544, 255	361, 729	8, 853, 577	316, 777

Species	Lines				Pound nets		Floating traps	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					126, 917	$1, 078	41, 350	$413
Bluefish	1, 050	$263			20, 662	2, 922	7, 888	598
Bonito					94, 132	6, 571		
Butterfish					518, 291	45, 955	30, 655	2, 912
Cod	3, 928, 508	135, 745	35, 830, 795	$1, 140, 600	51, 285	1, 644	42, 892	1, 397
Crevalle					440	9		
Cusk	97, 507	2, 499	3, 176, 839	81, 033				
Eels	18, 690	1, 374	30, 240	2, 474	10, 700	1, 329		
Flounders	59, 300	3, 049	443, 670	21, 009	16, 142	963	1, 500	52
Frigate mackerel					3, 490	113		
Goosefish					7, 000	45		
Grayfish					79, 006	638		
Haddock	607, 473	20, 561	36, 561, 305	1, 296, 019				
Hake	100, 725	3, 250	8, 949, 355	252, 764				
Halibut	92, 391	16, 160	2, 408, 242	381, 600				
Herring, sea					4, 072, 820	53, 960	528, 700	6, 787
King whiting or "kingfish"					28	3		
Mackerel	20, 915	1, 100			2, 325, 423	81, 854	190, 977	6, 263
Pollock	250, 846	4, 846	1, 809, 078	35, 434	37, 336	68, 333	136, 100	2, 089
Porpoise					45	1		
Rosefish			20, 050	301				
Scup or porgy	822, 415	41, 890			85, 413	3, 329		
Sea bass	180, 000	18, 000			4, 096	323		
Shad					11, 679	713	200	19
Sharks					10, 937	102		
Skates			20, 000	1, 000	7, 306	99		
Skipper or "billfish"					1, 000	200		
Smelt	14, 910	2, 891						
Squeteagues					4, 363	687		
Striped bass					1, 690	305		
Sturgeon					1, 811	362		
Tautog	144, 379	9, 283	8, 250	330	22, 133	1, 381	50	5
Thimble-eyed mackerel					16, 355	325		
Tomcod					6, 065	225		
Tuna or "horse mackerel"					42, 661	2, 387		
Whiting					5, 737, 535	35, 919	465, 800	4, 451
Wolffish	29, 645	1, 175	290, 437	9, 672				
Lobsters					4	1		
Squid					3, 131, 650	56, 700	134, 900	1, 173
Total	6, 368, 754	262, 086	89, 548, 261	3, 222, 236	16, 448, 415	368, 476	1, 581, 012	26, 159

Fisheries of Massachusetts, 1929—Continued

CATCH: BY GEAR—Continued

Species	Weirs		Fyke nets		Dip nets		Push nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					125,000	$1,750		
Bluefish	20,000	$3,000						
Bonito	1,500	150						
Butterfish	101,000	8,200						
Cod	40,000	1,200						
Eels			75,710	$12,317	9,000	800		
Grayfish	30,000	900						
Herring, sea	60,000	700			6,120,000	84,400		
Mackerel	150,000	8,700						
Minnows					3,000	2,000		
Skipper or "billfish"	1,500	375						
Striped bass	2,000	600						
Tuna or "horse mackerel"	1,500	150						
Whiting	688,000	27,520						
Shrimp					3,000	2,250		
Squid	240,000	5,400						
Scallops: Bay							32,046	$13,173
Total	1,335,500	56,895	75,710	12,317	6,260,000	91,200	32,046	13,173

Species	Otter trawls		Pots					
			Crab		Eel		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Butterfish	72,001	$7,006						
Cod	19,906,898	691,154						
Cunners	45	2						
Cusk	366,353	10,156						
Eels	1,611	64			176,854	$17,903		
Flounders	33,677,730	1,489,807						
Haddock	173,804,107	5,808,060						
Hake	6,439,842	169,331						
Halibut	380,960	58,706						
Mackerel	98,781	6,085						
Pollock	3,803,638	99,688						
Rosefish	50,484	1,053						
Salmon	100	4						
Shad	340	15						
Sharks	867	28						
Skates	40,206	910						
Sturgeon	2,992	466						
Swordfish	989	139						
Tilefish	305,000	18,979						
Whiting	980,664	17,901						
Wolffish	1,122,213	34,893						
Crabs, hard			4,085,352	$92,800			284,875	$7,868
Lobsters							1,630,527	591,226
Scallops: Sea	4,800	819						
Total	241,060,621	8,415,266	4,085,352	92,800	176,854	17,903	1,915,402	599,094

Species	Pots, periwinkle and cockle		Harpoons		Spears		Dredges, clam	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels					57,628	$8,019		
Flounders					10,000	300		
Swordfish			4,455,299	$681,429				
Clams:								
Cockle	6,300	$2,898						
Hard							985,928	$252,150
Periwinkles	6,000	240					3,000	300
Total	12,300	3,138	4,455,299	681,429	67,628	8,319	988,928	252,450

Fisheries of Massachusetts, 1929—Continued

CATCH: BY GEAR—Continued

Species	Dredges						Tongs	
	Mussel		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard							234, 024	$89, 760
Soft							3, 150	787
Mussels, sea	10, 320	$1, 219						
Oysters:								
Market, private			183, 750	$83, 500			189, 350	92, 025
Seed, private			98, 434	15, 010			13, 725	1, 277
Scallops:								
Bay					1, 466, 194	$508, 777		
Sea					461, 480	106, 929		
Total	10, 320	1, 219	282, 184	98, 510	1, 927, 674	615, 706	440, 249	183, 849

Species	Rakes		Forks		Hoes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:						
Hard	765, 336	$273, 961			7, 200	$2, 700
Razor					126, 600	15, 680
Soft	5, 860	2, 030	334, 650	$56, 930	1, 767, 100	316, 083
Oysters:						
Market, private	3, 500	1, 625	2, 709	1, 161		
Seed, private			10, 850	1, 008		
Irish moss	144, 000	8, 640				
Total	918, 696	286, 256	348, 209	59, 099	1, 900, 900	334, 463

OPERATING UNITS: BY COUNTIES

Items	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	150	263	62	1, 771	87		3	2, 201
On boats and shore—								
Regular	1, 137	374	264	508	185	69	493	445
Casual	161	6	16	119		8	80	
Total	1, 448	643	342	2, 398	272	77	576	2, 646
Vessels:								
Motor—								
5 to 10 tons	14	9	7	12	9		2	15
11 to 20 tons	12	15	4	39	14			65
21 to 30 tons		8	1	17	1			15
31 to 40 tons		5		7				7
41 to 50 tons		2	1	11				7
51 to 60 tons		1		22				18
61 to 70 tons	1			16				11
71 to 80 tons				11				3
81 to 90 tons				3				
91 to 100 tons				6				3
101 to 110 tons				1				3
111 to 120 tons								9
121 to 130 tons								1
131 to 140 tons								1
151 to 160 tons								1
171 to 180 tons								2
201 to 210 tons								1
Total	27	40	13	145	24		2	162
Net tonnage	354	823	184	5, 883	268		15	6, 515
Sail—5 to 10 tons	1							
Net tonnage	6							

Fisheries of Massachusetts, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Vessels—Continued.								
Steam—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
91 to 100 tons	--------	--------	--------	--------	--------	--------	--------	6
111 to 120 tons	--------	--------	--------	--------	--------	--------	--------	6
121 to 130 tons	--------	--------	--------	--------	--------	--------	--------	1
131 to 140 tons	--------	--------	--------	--------	--------	--------	--------	1
151 to 160 tons	--------	--------	--------	--------	--------	--------	--------	1
161 to 170 tons	--------	--------	--------	--------	--------	--------	--------	1
171 to 180 tons	--------	--------	--------	--------	--------	--------	--------	2
181 to 190 tons	--------	--------	--------	1	--------	--------	--------	--------
201 to 210 tons	--------	--------	--------	--------	--------	--------	--------	1
211 to 220 tons	--------	--------	--------	--------	--------	--------	--------	2
241 to 250 tons	--------	--------	--------	--------	--------	--------	--------	1
261 to 270 tons	--------	--------	--------	--------	--------	--------	--------	1
Total	--------	--------	--------	1	--------	--------	--------	23
Net tonnage	--------	--------	--------	184	--------	--------	--------	3, 369
Total vessels	28	40	13	146	24	--------	2	185
Total net tonnage	360	823	184	6, 067	268	--------	15	9, 884
Boats:								
Motor	568	244	138	273	88	35	309	143
Other	366	126	55	238	20	13	178	16
Accessory boats	34	18	17	584	2	--------	2	348
Apparatus:								
Purse seines—								
Other than menhaden	6	--------	--------	49	--------	--------	--------	44
Length, yards	2, 280	--------	--------	25, 350	--------	--------	--------	22, 410
Haul seines	3	--------	4	4	--------	--------	--------	--------
Length, yards	740	--------	990	240	--------	--------	--------	--------
Gill nets—								
Anchor	494	--------	--------	1, 556	26	--------	--------	--------
Square yards	59, 680	--------	--------	469, 524	10, 400	--------	--------	--------
Drift	1, 600	303	400	5, 086	--------	--------	37	3, 264
Square yards	800, 325	98, 448	140, 000	1, 661, 100	--------	--------	20, 720	899, 060
Lines—								
Hand	68	148	11	244	2	3	7	140
Hooks	134	294	22	378	2	6	12	258
Trawl	4, 752	10	20	20, 767	40	--------	63	26, 770
Hooks	237, 600	5, 000	600	986, 390	2, 000	--------	3, 500	1, 342, 880
Pound nets	108	10	15	1	4	--------	4	--------
Floating traps	--------	--------	--------	14	--------	--------	--------	--------
Weirs	6	--------	--------	--------	--------	--------	--------	--------
Fyke nets	86	4	18	--------	--------	--------	--------	--------
Dip nets	19	--------	--------	8	6	3	10	12
Push nets	55	--------	--------	--------	--------	--------	--------	--------
Otter trawls	70	30	18	52	40	--------	--------	209
Yards at mouth	1, 683	952	490	1, 510	1, 042	--------	--------	5, 705
Pots—								
Crab	--------	--------	--------	960	--------	--------	30	1, 500
Eel	610	100	235	40	557	--------	30	--------
Lobster	6, 462	9, 958	7, 065	12, 870	1, 000	2, 676	11, 638	1, 829
Periwinkle and cockle	375	--------	--------	--------	--------	--------	115	--------
Harpoons	7	8	9	54	2	--------	--------	27
Spears	44	24	15	15	--------	--------	7	--------
Dredges—								
Clam	47	9	5	--------	31	--------	--------	--------
Yards at mouth	19	6	2	--------	21	--------	--------	--------
Mussel	--------	--------	--------	--------	--------	--------	--------	1
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	2
Oyster	20	4	--------	--------	--------	--------	14	--------
Yards at mouth	30	6	--------	--------	--------	--------	18	--------
Scallop	769	492	366	1	366	--------	715	--------
Yards at mouth	631	510	260	3	239	--------	664	--------
Tongs	68	73	--------	--------	3	--------	32	--------
Rakes	233	20	61	--------	8	--------	85	--------
Forks	--------	--------	--------	--------	--------	48	29	--------
Hoes	143	13	2	251	2	--------	70	--------

Fisheries of Massachusetts, 1929—Continued

CATCH: BY COUNTIES

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	106, 376	$1, 848	3, 866	$80	647, 050	$6, 643	287, 860	$3, 730
Bluefish	27, 640	3, 641	10, 916	1, 937	2, 816	542	7, 888	598
Bonito	16, 670	1, 667			28, 912	1, 046		
Butterfish	619, 943	52, 255	12, 763	1, 110	36, 009	3, 493	65, 026	6, 147
Cod	5, 043, 240	156, 004	1, 263, 689	42, 096	126, 310	3, 715	23, 621, 939	820, 327
Crevalle					440	9		
Cusk	71, 996	1, 536	14, 233	427			1, 853, 760	46, 626
Eels	332, 125	24, 122	56, 048	8, 123	48, 600	5, 250	34, 540	5, 230
Flounders	9, 104, 658	330, 621	4, 260, 046	196, 928	1, 171, 685	40, 567	1, 723, 837	86, 568
Frigate mackerel					3, 490	113		
Goosefish			7, 000	45				
Grayfish	77, 320	1, 234	2, 384	22	34, 202	385		
Haddock	4, 723, 848	143, 086	13, 402, 897	473, 931	327, 094	13, 998	48, 824, 550	1, 712, 835
Hake	881, 103	22, 786	53, 597	865	5, 749	112	4, 886, 727	134, 930
Halibut	20, 879	3, 156	38, 129	6, 464			2, 108, 296	336, 037
Herring, sea	4, 104, 510	60, 374	21, 190	197	120	1	2, 710, 368	54, 612
King whiting or "kingfish"					28	3		
Mackerel	6, 369, 025	220, 291	309, 447	15, 681	424, 067	15, 028	28, 588, 860	1, 087, 714
Minnows	3, 000	2, 000						
Pollock	251, 691	71, 986	11, 000	191	16, 395	242	6, 700, 894	124, 303
Porpoise					45	1		
Rosefish	1, 000	10					5, 680	105
Scup or porgy	124, 511	6, 035	750, 110	37, 508	32, 207	1, 620		
Sea bass	1, 000	100	180, 220	18, 015	2, 876	208		
Shad	11, 685	678	61	5	323	50	79, 254	5, 607
Sharks	2, 070	9	8, 697	85	170	8	14, 028	312
Skates	5, 113	313	5, 450	84	243	12	8, 430	124
Skipper or "billfish"	2, 500	575						
Smelt							5, 350	1, 935
Squeteagues	101	12	2, 435	426	1, 777	239		
Striped bass	18, 665	3, 900	25	5	471	106		
Sturgeon	1, 811	362					448	42
Swordfish	244, 591	36, 126	356, 335	55, 292	459, 803	67, 919	2, 461, 765	384, 514
Tautog	45, 396	2, 332	116, 659	8, 002	3, 957	300	50	5
Thimble-eyed mackerel					16, 355	325		
Tomcod			6, 065	225				
Tuna or "horse mackerel"	41, 761	2, 362						
White perch					19, 600	2, 896		
Whiting	6, 147, 570	60, 710	36, 965	305	5, 000	59	575, 800	5, 551
Wolffish	153, 485	3, 561	7, 760	197			165, 336	5, 970
Crabs, hard							896, 062	19, 960
Lobsters	218, 711	71, 994	236, 015	75, 169	287, 359	90, 369	382, 686	158, 579
Shrimp	3, 000	2, 250						
Squid	3, 223, 471	56, 214	71, 134	888	41, 545	812	134, 900	1, 173
Clams:								
Cockle	4, 200	1, 932						
Hard	1, 003, 456	331, 301	199, 840	69, 790	192, 120	78, 050		
Razor	49, 400	12, 350						
Soft	129, 960	32, 897	3, 500	875	2, 000	400	1, 449, 400	251, 990
Oysters:								
Market, private	352, 800	166, 950	1, 050	450				
Seed, private	17, 500	7, 500	12, 600	1, 170				
Periwinkles	6, 000	240	3, 000	300				
Scallops:								
Bay	561, 390	196, 180	164, 058	65, 136	210, 510	65, 601		
Sea	8, 100	4, 050	436, 280	99, 202			18, 300	3, 896
Total	44, 133, 271	2, 097, 550	22, 065, 464	1, 181, 226	4, 149, 328	400, 122	127, 612, 034	5, 259, 420

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			25, 000	$250			315, 700	$4, 574
Bluefish	1, 430	$293						
Bonito	51, 150	4, 100			100	$8		
Butterfish	20, 800	2, 825			3, 000	300	42, 635	4, 090
Cod	824, 161	21, 772	8, 500	245	36, 500	1, 470	33, 222, 606	1, 126, 712
Cunners							45	2
Cusk							1, 702, 776	45, 140
Eels	45, 500	3, 900			37, 450	2, 182	70	8
Flounders	5, 104, 640	214, 998	1, 200	84	100	5	12, 956, 201	650, 102
Haddock	1, 231, 195	33, 459			20, 500	925	144, 350, 686	4, 805, 398
Hake							10, 041, 436	276, 939
Halibut	457	75					714, 325	110, 818
Herring, sea					2, 542, 000	18, 238	3, 619, 750	63, 262
Mackerel	14, 800	795			125, 000	3, 800	18, 405, 065	646, 129
Pollock	1, 975	104	1, 000	50	200	14	4, 595, 363	115, 327

Fisheries of Massachusetts, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Rosefish	--------	--------	--------	--------	--------	--------	63, 854	$1, 239
Salmon	--------	--------	--------	--------	--------	--------	100	4
Scup or porgy	1, 000	$56	--------	--------	--------	--------	--------	--------
Shad	--------	--------	--------	--------	--------	--------	1, 180	57
Sharks	--------	--------	--------	--------	--------	--------	867	28
Skates	--------	--------	--------	--------	--------	--------	48, 276	1, 476
Smelt	--------	--------	--------	--------	9, 560	$956	--------	--------
Squeteagues	50	10	--------	--------	--------	--------	--------	--------
Sturgeon	900	200	--------	--------	--------	--------	2, 592	432
Swordfish	80, 000	11, 970	--------	--------	--------	--------	853, 794	125, 747
Tautog	--------	--------	--------	--------	8, 750	360	--------	--------
Tilefish	--------	--------	--------	--------	--------	--------	305, 000	18, 979
Tuna or "horse mackerel"	--------	--------	--------	--------	2, 400	175	--------	--------
Whiting	1, 000	15	--------	--------	125, 000	1, 250	980, 664	17, 901
Wolffish	--------	--------	--------	--------	--------	--------	1, 124. 457	36, 488
Crabs, hard	--------	--------	1, 800	$250	17, 700	2, 728	3, 454, 665	77, 730
Lobsters	36, 600	13, 330	79, 324	32, 600	340, 926	129, 435	48, 910	19, 751
Squid	25, 500	3, 986	--------	--------	10, 000	200	--------	--------
Clams:								
Cockle	--------	--------	--------	--------	2, 100	966	--------	--------
Hard	512, 192	107, 600	--------	--------	84, 880	31, 830	--------	--------
Razor	--------	--------	--------	--------	77, 200	3, 330	--------	--------
Soft	14, 000	2, 800	300, 000	50, 000	211, 900	36, 868	--------	--------
Mussels, sea	--------	--------	--------	--------	--------	--------	10, 320	1, 219
Oysters:								
Market, private	--------	--------	--------	--------	25, 459	10, 911	--------	--------
Seed, private	--------	--------	--------	--------	92, 909	8, 625	--------	--------
Scallops:								
Bay	152, 782	58, 533	--------	--------	409, 500	136, 500	--------	--------
Sea	--------	--------	--------	--------	--------	--------	3, 600	600
Irish moss	--------	--------	--------	--------	144, 000	8, 640	--------	--------
Total	8, 120, 132	480, 821	416, 824	83, 479	4, 327, 134	399, 716	236, 864, 937	8, 150, 152

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 98 persons in Massachusetts engaged primarily in transporting fishery products by means of vessels. In this trade 16 motor vessels and 4 sailing vessels, having a combined capacity of 885 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 143 wholesale establishments in Massachusetts engaged primarily in handling fresh and frozen products. These establishments employed 2,166 persons, who received $3,512,992 in salaries and wages. Suffolk County alone accounted for 92 of these establishments.

Manufacturing.—There were 36 establishments in Massachusetts in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 1,522 persons, who received $1,978,282 in salaries and wages. The products manufactured, consisting principally of cured and canned fish and liquid glue, were valued at $6,030,304.

Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were 1,015 fishermen in Massachusetts who prepared fishery products. Their output, consisting principally of salted cod, herring, and mackerel, amounted to 1,966,804 pounds, valued at $79,553.

Industries related to the fisheries of Massachusetts, 1929

TRANSPORTING

Items	Number	Items	Number
Persons engaged on transporting vessels	98	Transporting vessels—Continued.	
Transporting vessels:		Sail—	
Motor—		61 to 70 tons	1
5 to 10 tons	6	81 to 90 tons	1
11 to 20 tons	5	131 to 140 tons	1
21 to 30 tons	1	151 to 160 tons	1
41 to 50 tons	1	Total	4
71 to 80 tons	1	Net tonnage	443
91 to 100 tons	2		
		Total vessels	20
Total	16	Total net tonnage	885
Net tonnage	442		

WHOLESALE

Items	Barnstable County	Bristol County	Dukes, Nantucket, and Norfolk Counties	Essex County	Plymouth County	Suffolk County	Total
Establishments	21	9	3	14	4	92	143
Persons engaged:							
Proprietors	24	8	3	4	2	28	69
Salaried employes	29	13	3	42	8	443	538
Wage earners	184	42	7	219	11	1, 096	1, 559
Paid to salaried employes	$70, 983	$27, 036	$3, 800	$69, 932	$9, 720	$1, 324, 290	$1, 505, 761
Paid to wage earners	216, 590	44, 724	8, 450	193, 675	14, 514	1, 529, 278	2, 007, 231
Total salaries and wages	287, 573	71, 760	12, 250	263, 607	24, 234	2, 853, 568	3, 512, 992

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	36	Salted pounds	19, 391, 807	$1, 512, 421
Persons engaged:		Smoked do	5, 376, 878	839, 268
Proprietors	22	Pickled do	477, 000	29, 364
Salaried employes	222	Canned:		
Wage earners	1, 278	Mackerel standard cases [2]	9, 832	87, 684
		Miscellaneous fishery products [3] do	197, 974	1, 470, 455
Paid to salaried employes	$610, 747	By-products:		
Paid to wage earners	1, 367, 535	Scrap and meal tons	10, 346	667, 831
Total salaries and wages	1, 978, 282	Cod-liver oil, crude gallons	194, 880	130, 362
		Liquid glue do	504, 250	1, 207, 885
		Other products [4]		85, 034
		Total		6, 030, 304

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value	Items	Quantity	Value
Fishermen engaged number	1, 515		Salted products—Continued		
Salted products:			Herring pounds	1, 132, 712	$42, 845
Cod pounds	589, 272	$24, 555	Mackerel do	216, 490	10, 741
Cusk do	3, 170	87	Pollock do	1, 590	32
Hake do	3, 110	80	Smoked products: Herring do	20, 000	1, 167
Halibut do	460	46	Total	1, 966, 804	79, 553

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[1] Includes the production of 6 firms whose activities were principally in the wholesale industry.

[2] A "standard case" represents the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case.

[3] Includes finnan haddie, haddock chowder, fish cakes, fish flakes, fiskeboller, ready-to-fry, ready-to-serve, fish for cats and dogs, and deep sea roe.

[4] Includes miscellaneous oil, isinglass, and mussel-shell products.

RHODE ISLAND

The fisheries and industries related to the fisheries of Rhode Island in 1929 employed 1,907 persons, which is 14 per cent more than the number employed in the previous year. Of the total number of persons, 1,406 were fishermen, 61 were employed on transporting vessels, and 440 in the wholesale and manufacturing industries.

The total catch amounted to 28,401,268 pounds, valued at $2,435,346, which is an increase of 3 per cent in the catch and 2 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of oysters accounted for 21 per cent; clams, 18 per cent: lobsters, 14 per cent; and flounders, 9 per cent. Of the total weight of the catch, that of flounders accounted for 17 per cent; cod, 9 per cent; whiting, sea herring, and oysters, each 8 per cent; mackerel and squid, each 7 per cent; and scup or porgy, 6 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Rhode Island during 1929 was taken by 1,406 fishermen, who used 80 motor vessels, 1,019 motor and other small fishing boats, and 17 major types of gear. The vessels had a combined capacity of 917 net tons. The fisheries accounting for the greatest number of persons were the fishery by tongs, employing 443 fishermen; the lobster-pot fishery, employing 400 fishermen; and the hand-line fishery employing 216 fishermen.

CATCH BY GEAR

Five types of gear accounted for 81 per cent of the fishery products taken in the marine fisheries of Rhode Island during 1929. Listed in order of their importance, they were: Floating traps, which accounted for 34 per cent of the catch; otter trawls, 19 per cent; hand lines, 11 per cent; dredges, 9 per cent; and purse seines, 8 per cent. The catch by floating traps was principally whiting, squid, scup, mackerel, and butterfish; that by otter trawls, chiefly flounders; that by lines, mainly cod and haddock; that by dredges, principally oysters; and that by purse seines, herring and mackerel.

OPERATING UNITS BY COUNTIES

Newport County was foremost in the number of persons fishing, accounting for 47 per cent of the total. Kent County followed with 20 per cent. Other counties employing a considerable number of fisherman were Washington and Providence. Newport County alone accounted for 68 per cent of the fishing vessels. It also accounted for 41 per cent of the motor and other small fishing boats. Kent County accounted for 29 per cent of the small fishing boats.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of five counties in Rhode Island during 1929. Ranked according to their value, the fisheries of Newport County were most important, accounting for 71 per cent of the total catch and 48 per cent of the total value of the catch. Washington County was next in value of the catch, accounting for 16 per cent of the quantity and 16 per cent of the value. The next county in importance was Kent, followed in order by Bristol and Providence.

Fisheries of Rhode Island, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines		Haul seines	Gill nets		Lines		Pound nets	Floating traps
	Menhaden	Other		Drift	Runaround	Hand	Trawl		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	17	29	--------	12	--------	60	8	--------	--------
On boats and shore—									
Regular	--------	55	23	1	4	144	34	34	185
Casual	--------	--------	4	1	--------	12	--------	--------	10
Total	17	84	27	14	4	216	42	45	195
Vessels:									
Motor—									
5 to 10 tons	--------	5	--------	1	--------	22	1	--------	--------
11 to 20 tons	--------	2	--------	2	--------	2	1	--------	--------
41 to 50 tons	1	--------	--------	--------	--------	--------	--------	--------	--------
Total	1	7	--------	3	--------	24	2	--------	--------
Net tonnage	45	72	--------	39	--------	176	22	--------	--------
Boats:									
Motor	--------	10	5	1	2	103	23	18	30
Other	--------	20	8	1	2	43	--------	41	74
Accessory boats	2	10	--------	--------	--------	--------	3	--------	--------
Apparatus:									
Number	1	17	9	200	2	365	1,556	64	75
Length, yards	600	2,520	1,155	--------	--------	--------	--------	--------	--------
Square yards	--------	--------	--------	99,600	22,000	--------	--------	--------	--------
Hooks, baits or snoods	--------	--------	--------	--------	--------	2,348	72,640	--------	--------

Items	Fyke nets	Dip nets	Otter trawls	Pots			Harpoons	Spears
				Eel	Lobster	Periwinkle		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	--------	--------	131	--------	42	--------	85	--------
On boats and shore—								
Regular	11	34	48	43	305	10	52	92
Casual	1	--------	2	6	53	3	--------	42
Total	12	34	181	49	400	13	137	134
Vessels:								
Motor—								
5 to 10 tons	--------	--------	41	--------	17	--------	26	--------
11 to 20 tons	--------	--------	10	--------	1	--------	4	--------
21 to 30 tons	--------	--------	1	--------	--------	--------	--------	--------
Total	--------	--------	52	--------	18	--------	30	--------
Net tonnage	--------	--------	443	--------	127	--------	247	--------
Boats:								
Motor	6	20	29	35	246	11	31	--------
Other	5	--------	--------	13	64	2	21	47
Accessory boats	--------	--------	--------	--------	--------	--------	29	--------
Apparatus:								
Number	54	30	83	2,505	38,518	780	70	134
Yards at mouth	--------	--------	2,117	--------	--------	--------	--------	--------

Fisheries of Rhode Island, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Dredges			Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
	Clam	Oyster	Scallop						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	2	65		3					243
On boats and shore—									
Regular			142	304	146	10	2	9	852
Casual			54	136	13	25	15		311
Total	2	65	196	443	159	35	17	9	1,406
Vessels:									
Motor—									
5 to 10 tons	1	2		2					54
11 to 20 tons		8							19
21 to 30 tons		2							3
41 to 50 tons		1							2
51 to 60 tons		2							2
Total	1	15		2					80
Net tonnage	7	337		12					917
Boats:									
Motor			110	176	45				500
Other				276	51		2		519
Accessory boats									40
Apparatus:									
Number	2	30	573	362	159	35	17		
Yards at mouth	3	45	957						

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Menhaden		Other				Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish							450	$90	2,500	$500
Eels					30,000	$3,600				
Herring, sea			2,026,700	$27,656						
Mackerel	20,400	$408	257,000	7,725			230,000	5,500		
Menhaden	109,000	1,098								
Smelt					7,740	1,393				
Squeteagues							225	45	1,600	288
Striped bass					1,650	396				
Tomcod					900	36				
White perch					425	170				
Total	129,400	1,506	2,283,700	35,381	40,715	5,595	230,675	5,635	4,100	788

Fisheries of Rhode Island, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Floating traps		Fyke nets	
	Hand		Trawl							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					61, 855	$1, 222	57, 534	$915		
Bluefish	2, 250	$427			3, 935	787	64, 365	11, 453		
Bonito					160	16	44, 600	4, 892		
Butterfish					136, 704	16, 252	1, 089, 654	123, 020		
Cod	1, 569, 465	65, 205	543, 620	$21, 622	6, 201	280	272, 592	12, 447		
Cunners							1, 000	50		
Eels	10, 000	1, 200			52, 640	5, 288	3, 256	326	1, 600	$192
Flounders	1, 800	107	1, 560	88	32, 578	1, 478	519, 518	25, 729	6, 930	398
Grayfish					2, 500	50	16, 900	338		
Haddock	76, 911	2, 765	444, 400	16, 735			1, 650	60		
Hake	36, 960	1, 182	32, 400	1, 080	1, 320	36				
Herring, sea					86, 307	1, 427	51, 209	1, 223		
Hickory shad					320	17	2, 600	130		
Mackerel	229, 560	11, 820			68, 850	2, 709	1, 171, 050	66, 948		
Menhaden					17, 950	180	5, 932	58		
Pollock	55, 178	1, 752					75, 542	2, 134		
Scup or porgy					12, 625	773	1, 611, 604	101, 037		
Sea bass					172	19	71, 488	7, 245		
Sea robin					36, 500	365	207, 649	4, 043		
Shad					12, 271	1, 731	2, 982	462		
Sharks					185	2	8, 490	169		
Skates	8, 620	172	15, 000	300	8, 398	425	103, 606	2, 208		
Skipper or "billfish"							1, 350	405		
Smelt					4, 200	1, 000				
Squeteagues					36, 284	6, 472	27, 020	4, 490		
Striped bass	620	148			315	63	20, 000	3, 990		
Sturgeon							500	75		
Swellfish	51, 200	3, 972								
Tautog	65, 360	4, 504			42, 795	2, 546	34, 950	2, 262	34, 000	1, 735
Tuna or "horse mackerel"	9, 260	926			2, 500	375	33, 687	3, 331		
White perch					1, 106	221				
Whiting					50, 150	1, 507	2, 348, 670	67, 673		
Squid					161, 255	4, 857	1, 939, 533	58, 810		
Total	2, 117, 184	94, 180	1, 036, 980	39, 825	840, 076	50, 098	9, 788, 931	505, 923	42, 530	2, 325

Species	Dip nets		Otter trawls		Pots					
					Eel		Lobster		Periwinkle	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod			118, 953	$4, 349						
Cunners	97, 000	$2, 920	18, 750	187						
Eels			18, 000	360	258, 350	$28, 154				
Flounders			4, 227, 000	184, 366						
Goosefish			10, 000	200						
Haddock			55, 997	2, 059						
Hake			33, 820	423						
Herring, sea	200, 000	2, 666								
Sea robin			10, 400	114						
Skates			757, 150	7, 699						
Tautog			5, 000	400						
Whiting			4, 000	31						
Grabs, hard							260, 068	$7, 802		
Lobsters							1, 353, 515	341, 568		
Periwinkles							800	120	68, 000	$16, 200
Total	297, 000	5, 586	5, 259, 070	200, 188	258, 350	28, 154	1, 614, 383	349, 490	68, 000	16, 200

Species	Harpoons		Spears		Dredges					
					Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			47, 540	$6, 305						
Swordfish	471, 975	$56, 223								
Clams:										
Hard, public					6, 000	$1, 875				
Hard, private							54, 400	$18, 100		
Oysters: Market, private							2, 323, 377	517, 763		
Scallops, bay									98, 648	$55, 754
Total	471, 975	56, 223	47, 540	6, 305	6, 000	1, 875	2, 377, 777	535, 863	98, 648	55, 754

Fisheries of Rhode Island, 1929—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public	1,207,904	$378,889	142,480	$48,195			2,800	$875		
Hard, private	2,400	750								
Soft, public			15,600	4,680	13,000	$3,900	250	100		
Oysters: Market, public	3,500	1,000								
Scallops, bay									300	$63
Total	1,213,804	380,639	158,080	52,875	13,000	3,900	3,050	975	300	63

OPERATING UNITS: BY COUNTIES

Items	Bristol	Kent	Newport	Providence	Washington
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	27	4	153	33	26
On boats and shore—					
Regular	50	155	430	50	167
Casual	13	126	78	24	70
Total	90	285	661	107	263
Vessels:					
Motor—					
5 to 10 tons	2	1	41	2	8
11 to 20 tons	5	1	11		2
21 to 30 tons	1		1	1	
41 to 50 tons			1	1	
51 to 60 tons				2	
Total	8	2	54	6	10
Net tonnage	119	18	500	197	83
Boats:					
Motor	28	142	191	26	113
Other	29	155	225	35	75
Accessory boats			36	2	2
Apparatus:					
Purse seines—					
Menhaden			1		
Length, yards			600		
Other			17		
Length, yards			2,520		
Haul seines				5	4
Length, yards				500	655
Gill nets—					
Drift		2	198		
Square yards		1,200	98,400		
Runaround					2
Square yards					22,000
Lines—					
Hand	2	1	231	21	110
Hooks	4	2	231	21	2,090
Trawl			1,516		40
Hooks			70,640		2,000
Pound nets	2	1	41		20
Floating traps			57		18
Fyke nets		52			2
Dip nets	2		28		
Otter trawls			60	1	22
Yards at mouth			1,610	25	482
Pots—					
Eel	260	310	425	100	1,410
Lobster	2,135	1,110	24,082	320	10,871
Periwinkle	160		620		
Harpoons			56	2	12
Spears	4	33	25	26	46
Dredges—					
Clam			2		
Yards at mouth			3		
Oyster	16	2		8	4
Yards at mouth	24	3		12	6
Scallop	48	270	104		151
Yards at mouth	37	223	579		118
Tongs	39	163	42	68	50
Rakes		65	88	6	
Forks					35
Hoes					17

Fisheries of Rhode Island, 1929—Continued

CATCH: BY COUNTIES

Species	Bristol		Kent		Newport		Providence		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					93, 439	$1, 774			25, 950	$363
Bluefish			450	$90	62. 250	11, 007			10, 800	2, 160
Bonito					42, 760	4, 708			2, 000	200
Butterfish					1, 094, 508	124, 634			131, 850	14, 638
Cod	1, 122	$40			2, 406, 059	98, 988	5, 423	$221	98, 227	4, 654
Cunners	1, 000	40			96, 000	2, 880			19, 750	237
Eels	19, 240	2, 129	40, 500	4, 860	115, 596	10, 120	75, 350	9, 694	170, 700	18, 622
Flounders			8, 280	483	3, 869, 046	165, 472	2, 850	171	909, 210	46, 040
Goosefish									10, 000	200
Grayfish									19, 400	388
Haddock					578, 562	21, 600			396	19
Hake					78, 500	2, 526			26, 000	195
Herring, sea	35, 000	350			2, 319, 116	32, 238			10, 100	384
Hickory shad					100	5			2, 820	142
Mackerel					1, 808, 100	89, 875			168, 760	5, 235
Menhaden					109, 982	1, 108			22, 900	228
Pollock					88, 370	2, 341			42, 350	1, 545
Scup or porgy					1, 524, 829	95, 846			99, 400	5, 964
Sea bass					70, 910	7, 189			750	75
Sea robin					154, 649	3, 543			99, 900	979
Shad	12, 000	1, 680			2, 853	428			400	85
Sharks					7, 475	147			1, 200	24
Skates					339, 654	5, 249	3, 720	26	549, 400	5, 529
Skipper or "bill fish"					1, 350	405				
Smelt									11, 940	2, 393
Squeteagues			225	45	16, 890	2, 656			48, 014	8, 594
Striped bass					12, 600	2, 520			9, 985	2, 077
Sturgeon									500	75
Swellfish					51, 200	3, 972				
Swordfish					405, 255	50, 395	38, 040	1, 436	28, 680	4, 392
Tautog	1, 300	120	36, 450	1, 928	45, 130	2, 774	1, 600	144	97, 625	6, 481
Tomcod									900	36
Tuna or "horse mackel"					43, 447	4, 432			2, 000	200
White perch					1, 106	221			425	170
Whiting					2, 065, 170	57, 546			337, 650	11, 665
Crabs, hard	232, 734	6, 982			27, 334	820				
Lobsters	38. 300	11, 003	24, 571	6, 143	1, 008, 058	250, 009	3, 234	905	279, 352	73, 508
Squid					1, 328, 288	39, 252			772, 500	24, 415
Clams:										
Hard, public	81, 600	25, 500	875, 664	277, 316	145, 200	45, 375	189, 360	60, 443	67, 360	21, 200
Hard, private	44, 800	15, 100	9, 600	3, 000					2, 400	750
Soft, public							15, 600	4, 680	13, 250	4, 000
Oysters:										
Market, public									3, 500	1, 000
Market, private	1, 089, 480	222, 826	45, 500	6, 500			718, 921	187, 835	469, 476	100, 602
Periwinkles	9, 300	1, 445			59, 500	14, 875				
Scallops, bay	3, 780	1, 923	41, 148	24, 638	5, 300	2, 963	300	63	48, 420	26, 230
Total	1, 569, 656	289, 138	1, 082, 388	325, 003	20, 078, 586	1, 159, 893	1, 054, 398	265, 618	4, 616, 240	395, 694

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 61 persons in Rhode Island engaged primarily in transporting fishery products by means of vessels. In this trade 10 motor vessels, having a combined capacity of 202 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale and manufacturing.—There were 34 wholesale establishments engaged primarily in handling fresh and frozen products, and 1 establishment engaged primarily in the manufacture of canned products. These establishments gave employment to 440 persons who received $399,713 in salaries and wages. The products manufactured, consisting principally of canned clam products and oyster-shell products, were valued at $344,929.

Industries related to the fisheries of Rhode Island, 1929

TRANSPORTING

Items	Number
Persons engaged on transporting vessels	61
Transporting vessels:	
Motor—	
5 to 10 tons	5
11 to 20 tons	3
41 to 50 tons	1
51 to 60 tons	1
Total vessels	10
Total net tonnage	202

WHOLESALE[1]

ITEMS	Bristol County	Kent County	Newport County	Providence County	Washington County	Total
Establishments	8	8	10	6	3	35
Persons engaged:						
Proprietors	4	8	6	----------	----------	18
Salaried employees	12	3	12	19	7	53
Wage earners	89	25	29	168	58	369
Paid to salaried employees	$15, 520	$3, 320	$19, 068	$61, 556	$13, 714	$113, 178
Paid to wage earners	67, 273	26, 067	36, 192	109, 043	47, 960	286, 535
Total salaries and wages	82, 793	29, 387	55, 260	170, 599	61, 674	399, 713

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[1] Statistics relative to persons engaged and compensation for three firms which were engaged in manufacturing functions are included in this table. One of these was exclusively a manufacturer and the other two only manufactured incidentally. The products manufactured, consisting principally of canned clam products and oyster-shell products, were valued at $344,929.

CONNECTICUT

The fisheries and industries related to the fisheries of Connecticut in 1929 employed 2,335 persons, which is 7 per cent less than the number employed in 1928. Of the total number of persons, 1,708 were fishermen, 10 were employed on transporting vessels, and 617 in the wholesale and manufacturing industries.

The total catch amounted to 54,878,155 pounds, valued at $3,635,493, which is a decrease of 24 per cent in the catch but a gain of 10 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of haddock accounted for 36 per cent; oysters, 35 per cent; flounders, 9 per cent; and lobsters, 6 per cent. Of the total weight of the catch, that of haddock accounted for 51 per cent; oysters, 16 per cent; flounders, 15 per cent; and cod, 5 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Connecticut during 1929 was taken by 1,708 fishermen, who used 99 motor vessels, 4 sailing vessels, 31 steam vessels, 792 motor and other small fishing boats, and 16 major types of gear. The vessels had a combined capacity of 6,905 net tons. The fisheries accounting for the greatest number of persons were the otter-trawl fishery, employing 599 fishermen, and the oyster-dredge fishery, employing 349 fishermen.

CATCH BY GEAR

Two types of gear accounted for 87 per cent of the fishery products taken in the marine fisheries of Connecticut during 1929. In order of their importance they were: Otter trawls, which accounted for 72 per cent of the catch; and oyster dredges, 15 per cent. The catch by otter trawls was principally haddock, flounders, and cod, and that by oyster dredges was exclusively oysters.

OPERATING UNITS BY COUNTIES

New London County was foremost in the number of persons fishing, accounting for 50 per cent of the total. New Haven County, followed, with 18 per cent. New London County also led in the number of fishing craft, accounting for 49 per cent of the vessels and 40 per cent of the motor and other small fishing boats.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of six counties of Connecticut during 1929. Ranked according to value, the fisheries of New London County were by far the most important, accounting for 81 per cent of the total catch and 59 per cent of the total value of the catch. New Haven County accounted for 9 per cent of the catch and 21 per cent of the value. Fairfield and Middlesex Counties followed in order of importance with respect to value of the catch.

Fisheries of Connecticut, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines		Haul seines	Gill nets			Lines	
	Menhaden	Other		Anchor	Drift	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	60	131					30	42
On boats and shore—								
Regular		4	9	8	3	1	90	12
Casual			134	1	72			
Total	60	135	143	9	75	1	120	54
Vessels:								
Motor—								
5 to 10 tons		6						
11 to 20 tons		2					2	
21 to 30 tons		2					1	1
41 to 50 tons		1					1	
51 to 60 tons								1
61 to 70 tons		1						1
Total		12					4	3
Net tonnage		228					95	138
Steam—								
101 to 110 tons	1	1						
161 to 170 tons	1	1						
Total	2	2						
Net tonnage	268	268						
Total vessels	2	14					4	3
Total net tonnage	268	496					95	138
Boats:								
Motor		2	23	7	36	1	74	6
Other		2	65	9	50	1	67	6
Accessory boats	4	21					6	18
Apparatus:								
Number	2	16	92	21	65	1	436	588
Length, yards	480	2, 960	5, 819					
Square yards				14, 000	160, 190	120		
Hooks, baits, or snoods							744	27, 480

Fisheries of Connecticut, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Pound nets	Fyke nets	Dip nets	Otter trawls	Box traps	Pots		
						Crab	Eel	Lobster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	508	--------	--------	2	6
On boats and shore—								
Regular	17	1	--------	91	1	--------	14	230
Casual	--------	26	32	--------	--------	2	46	--------
Total	17	27	32	599	1	2	62	236
Vessels:								
Motor—								
5 to 10 tons	--------	--------	--------	28	--------	--------	1	3
11 to 20 tons	--------	--------	--------	20	--------	--------	--------	--------
21 to 30 tons	--------	--------	--------	1	--------	--------	--------	--------
31 to 40 tons	--------	--------	--------	1	--------	--------	--------	--------
Total	--------	--------	--------	50	--------	--------	1	3
Net tonnage	--------	--------	--------	543	--------	--------	10	22
Steam—								
121 to 130 tons	--------	--------	--------	2	--------	--------	--------	--------
161 to 170 tons	--------	--------	--------	3	--------	--------	--------	--------
171 to 180 tons	--------	--------	--------	2	--------	--------	--------	--------
181 to 190 tons	--------	--------	--------	1	--------	--------	--------	--------
201 to 210 tons	--------	--------	--------	9	--------	--------	--------	--------
291 to 300 tons	--------	--------	--------	1	--------	--------	--------	--------
Total	--------	--------	--------	18	--------	--------	--------	--------
Net tonnage	--------	--------	--------	3, 463	--------	--------	--------	--------
Total vessels	--------	--------	--------	68	--------	--------	1	3
Total net tonnage	--------	--------	--------	4, 006	--------	--------	10	22
Boats:								
Motor	14	2	3	56	--------	1	5	184
Other	14	19	22	53	--------	1	49	184
Apparatus:								
Number	22	123	32	124	12	60	1, 063	19, 900
Yards at mouth	--------	--------	--------	3, 273	--------	--------	--------	--------

Fisheries of Connecticut, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Harpoons	Spears	Dredges, oyster	Tongs	Rakes	Hoes	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	39		332				959
On boats and shore—							
Regular	5	33	15	59	21	40	397
Casual		27	2	59	43	30	352
Total	44	60	349	118	64	70	1,708
Vessels:							
Motor—							
5 to 10 tons	2		19				47
11 to 20 tons	3		10				31
21 to 30 tons	1		8				10
31 to 40 tons			2				3
41 to 50 tons			2				3
51 to 60 tons	1						1
61 to 70 tons			2				3
111 to 120 tons			1				1
Total	7		44				99
Net tonnage	128		880				1,623
Sail—							
5 to 10 tons			3				3
11 to 20 tons			1				1
Total			4				4
Net tonnage			30				30
Steam—							
51 to 60 tons			1				1
61 to 70 tons			2				2
71 to 80 tons			1				1
91 to 100 tons			2				2
101 to 110 tons			1				2
111 to 120 tons			1				1
121 to 130 tons							2
131 to 140 tons			1				1
161 to 170 tons							4
171 to 180 tons							2
181 to 190 tons							1
201 to 210 tons							9
291 to 300 tons							1
311 to 320 tons			1				1
391 to 400 tons			1				1
Total			11				31
Net tonnage			1,521				5,252
Total vessels	7		59				134
Total net tonnage	128		2,431				6,905
Boats:							
Motor	3	2	11	22	2	4	300
Other	3	60	7	97	33	20	492
Accessory boats	17						51
Apparatus:							
Number	10	60	205	98	64	70	
Yards at mouth			244				

Fisheries of Connecticut, 1929—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Menhaden		Other				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2, 400	$48				
Bluefish			69, 023	$10, 363						
Bonito			1, 805	131						
Butterfish							200	$20		
Carp					2, 350	316	5, 465	656		
Catfish and bullheads					128	6				
Croaker			44, 535	1, 406						
Mackerel			1, 988, 190	58, 158						
Menhaden	246, 291	$10, 000					10, 500	210	850	$17
Minnows					27, 307	7, 486				
Mummichog					3, 720	252				
Scup or porgy			385, 857	12, 940						
Sea bass			1, 340	139						
Shad					97, 606	7, 791			216, 126	23, 280
Smelt					8, 500	1, 550				
Squeteagues			63, 703	2, 542			468	64		
Suckers					5, 636	386				
Total	246, 291	10, 000	2, 554, 453	85, 679	147, 647	17, 835	16, 633	950	216, 976	23, 297

Species	Gill nets		Lines				Pound nets		Fyke nets	
	Stake		Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							1, 800	$36	5, 050	$103
Bluefish			149, 700	$23, 575			325	55		
Butterfish							15, 710	2, 058		
Carp									1, 909	251
Cod			86, 250	2, 588	139, 000	$4, 170				
Eels			1, 450	160	27, 490	2, 640	12, 400	1, 250	890	153
Flounders			600	15	210	5	24, 788	1, 617		
Haddock			2, 960	89	19, 500	585				
Hake					7, 640	318				
Halibut					90, 000	13, 500				
King whiting or "kingfish"							508	26		
Mackerel							26, 698	1, 186		
Menhaden							2, 600	52	1, 500	30
Pollock			1, 100	44						
Scup or porgy							25	3		
Sea bass			2, 000	318			15	3		
Skates					7, 010	231	10, 250	86		
Squeteagues			255	67			28, 460	4, 629		
Striped bass							2, 020	367		
Suckers									56, 656	4, 487
Tautog	200	$20	171, 010	14, 701			6, 251	601		
Tilefish			229, 082	16, 036	1, 442, 567	68, 701				
Whiting							500	5		
Squid							19, 750	574		
Total	200	20	644, 407	57, 593	1, 733, 417	90, 150	152, 100	12, 548	66, 005	5, 024

Species	Dip nets		Otter trawls		Box traps		Pots, crab	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Butterfish			13, 714	$1, 368				
Cod			2, 451, 637	104, 948				
Cusk			35, 479	357				
Eels			2, 166	103				
Flounders			8, 224, 469	337, 362				
Haddock			27, 740, 119	1, 295, 714				
Hake			285, 107	10, 978				
Halibut			42, 346	10, 120				
Mackerel			5, 960	270				
Pollock			316, 997	13, 083				
Sea robin			30, 000	250				
Shad	3, 801	$380						
Skates			278, 710	3, 604				
Smelt	1, 000	100						
Tomcod					650	$98		
Wolffish			17, 748	170				
Crabs:								
Hard	5, 620	560	450	225			168, 200	$3, 364
Soft	580	145						
Lobsters			200	50				
Sea urchins			2, 800	42				
Total	11, 001	1, 185	39, 447, 902	1, 778, 644	650	98	168, 200	3, 364

Fisheries of Connecticut, 1929—Continued

CATCH: BY GEAR—Continued

Species	Pots				Harpoons		Spears	
	Eel		Lobster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	53,774	$7,141					49,000	$5,370
Tautog					115,387	$18,492		
Whiting					2,568	295		
Lobsters			592,407	$203,323				
Total	53,774	7,141	592,407	203,323	117,955	18,787	49,000	5,370

Species	Dredges, oyster		Tongs		Rakes		Hoes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public			15,000	$5,000	20,650	$8,205	3,750	$1,339
Soft, public					54,210	16,363	44,760	13,696
Oysters:								
Market, public	2,905	$623	72,772	20,382				
Market, private	2,998,975	479,204	18,900	7,100				
Seed, public	148,918	21,274	105,000	11,250				
Seed, private	5,158,037	728,414	15,260	1,635				
Total	8,308,835	1,229,515	226,932	45,367	74,860	24,568	48,510	15,035

OPERATING UNITS: BY COUNTIES

Items	Fairfield	Hartford	Middlesex	New Haven	New London	Tolland
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	148			202	609	
On boats and shore—						
Regular	75		41	85	196	
Casual	77	109	88	19	57	2
Total	300	109	129	306	862	2
Vessels:						
Motor—						
5 to 10 tons	20			7	20	
11 to 20 tons	2			9	20	
21 to 30 tons	5			3	2	
31 to 40 tons				2	1	
41 to 50 tons	2				1	
51 to 60 tons					1	
61 to 70 tons	1			1	1	
111 to 120 tons				1		
Total	30			23	46	
Net tonnage	445			508	670	
Sail—						
5 to 10 tons	3					
11 to 20 tons	1					
Total	4					
Net tonnage	30					

Fisheries of Connecticut, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Fairfield	Hartford	Middlesex	New Haven	New London	Tolland
Vessels—Continued.						
Steam—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
51 to 60 tons	1					
61 to 70 tons				2		
71 to 80 tons	1					
91 to 100 tons	1			1		
101 to 110 tons				1	1	
111 to 120 tons	1					
121 to 130 tons					2	
131 to 140 tons				1		
161 to 170 tons					4	
171 to 180 tons					2	
181 to 190 tons					1	
201 to 210 tons					9	
291 to 300 tons					1	
311 to 320 tons				1		
391 to 400 tons				1		
Total	4			7	20	
Net tonnage	340			1, 181	3, 731	
Total vessels	38			30	66	
Total net tonnage	815			1, 689	4, 401	
Boats:						
Motor	48	10	61	44	137	
Other	91	54	91	73	181	2
Apparatus:						
Purse seines—						
Menhaden					2	
Length, yards					480	
Other					16	
Length, yards					2, 960	
Haul seines, common	32	39	9	4	8	
Length, yards	787	3, 562	750	240	480	
Gill nets—						
Anchor			10	8	3	
Square yards			11, 200	2, 440	360	
Drift		1	56	1	7	
Square yards		2, 475	139, 800	580	17, 335	
Stake	1					
Square yards	120					
Lines—						
Hand	16		87	9	324	
Hooks	26		87	9	622	
Trawl					588	
Hooks					27, 480	
Pound nets				2	20	
Fyke nets		91	27	5		
Dip nets		18			12	2
Otter trawls	13		12	16	83	
Yards at mouth	305		192	355	2, 421	
Box traps	12					
Pots—						
Crab					60	
Eel	199	47	225	217	375	
Lobster	3, 575		1, 872	3, 187	11, 266	
Harpoons, swordfish			1		9	
Spears	11		2	6	41	
Dredges, oyster	145			60		
Yards at mouth	141			103		
Tongs	31		26	37	4	
Rakes	48			16		
Hoes			9	12	49	

Fisheries of Connecticut, 1929—Continued

CATCH: BY COUNTIES

Species	Fairfield		Hartford		Middlesex		New Haven		New London and Tolland [1]	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			5, 050	$103	2, 400	$48			1, 800	$36
Bluefish					12, 325	2, 909	43	$11	206, 680	31, 073
Bonito									1, 805	131
Butterfish							110	11	29, 514	3, 435
Carp			1, 709	221	8, 015	1, 002				
Catfish and bullheads					128	6				
Cod							2, 186	87	2, 674, 701	111, 619
Croaker									44, 535	1, 406
Cusk									35, 479	357
Eels	9, 950	$1, 637	1, 100	204	15, 457	2, 439	7, 584	1, 137	113, 079	11, 400
Flounders	254, 623	21, 059			39, 316	3, 612	531, 605	26, 256	7, 424, 523	288, 072
Haddock									27, 762, 579	1, 296, 388
Hake									292, 747	11, 296
Halibut									132, 346	23, 620
King whiting or "kingfish"									508	26
Mackerel							88	5	2, 020, 760	59, 609
Menhaden							12, 850	257	248, 891	10, 052
Minnows	17, 940	4, 784	2, 795	1, 142	5, 072	1, 370	1, 350	160	150	30
Mummichog					1, 520	142	200	10	2, 000	100
Pollock					1, 100	44			316, 997	13, 083
Scup or porgy									385, 882	12, 943
Sea bass							315	63	3, 040	397
Sea robin									30, 000	250
Shad			92, 187	7, 357	190, 431	20, 057			34, 915	4, 037
Skates	29, 790	520			14, 810	296	150, 610	2, 068	100, 760	1, 037
Smelt	3, 500	1, 050							6, 000	600
Squeteagues					255	67	328	66	92, 303	7, 169
Striped bass									2, 020	367
Suckers			39, 789	3, 178	20, 503	1, 595			2, 000	100
Swordfish					1, 650	330			113, 737	18, 162
Tautog	22, 183	1, 802			13, 747	1, 584	5, 421	434	136, 110	11, 502
Tilefish									1, 671, 649	84, 737
Tomcod	650	98								
Tuna or "horse mackerel"									2, 568	295
Whiting									500	5
Wolffish									17, 748	170
Crabs:										
Hard									174, 270	4, 149
Soft									580	145
Lobsters	81, 875	33, 952			62, 757	26, 278	89, 869	36, 760	358, 106	106, 383
Squid									19, 750	574
Clams:										
Hard, public	19, 550	7, 605					16, 860	5, 929	2, 990	1, 010
Soft, public	7, 750	2, 425			6, 850	2, 293	53, 870	16, 191	30, 500	9, 150
Oysters:										
Market, public	2, 905	623			31, 822	6, 194	17, 850	3, 188	23, 100	11, 000
Market, private	1, 732, 269	241, 290					1, 275, 106	240, 014	10, 500	5, 000
Seed, public	253, 918	32, 524								
Seed, private	2, 356, 511	299, 943					2, 816, 786	430, 106		
Sea urchins									2, 800	42
Total	4, 793, 414	649, 312	142, 630	12, 205	428, 158	70, 266	4, 983, 031	762, 753	44, 530, 922	2, 140, 957

[1] The catch is for New London County, except for 117 pounds of shad, valued at $12, which was taken in Tolland County.

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 10 persons in Connecticut engaged primarily in transporting fishery products by means of vessels. In this trade five motor vessels, having a combined capacity of 44 net tons, were operated.

Wholesale and manufacturing.—There were 22 wholesale establishments engaged primarily in handling fresh and frozen products and one establishment engaged primarily in the manufacture of fishery by-products. These establishments employed 617 persons, who received $925,736 in salaries and wages. Manufactured products, consisting of menhaden products, fish meal from ground fish, cod and cod-liver oil, and oyster-shell products were valued at $220,043.

Industries related to the fisheries of Connecticut, 1929

TRANSPORTING

Items	Number
Persons engaged on transporting vessels	10
Transporting vessels:	
Motor—	
5 to 10 tons	4
11 to 20 tons	1
Total vessels	5
Total net tonnage	44

WHOLESALE [1]

Items	Fairfield County	New Haven County	New London County	Total
Establishments	6	9	8	23
Persons engaged:				
Proprietors	9	10	11	30
Salaried employees	7	27	38	72
Wage earners	87	68	360	515
Paid to salaried employees	$53, 712	$83, 079	$98, 062	$234, 853
Paid to wage earners	127, 703	65, 235	497, 945	690, 883
Total salaries and wages	181, 415	148, 314	596, 007	925, 736

[1] Statistics relative to persons engaged and compensation for 4 firms which were engaged in manufacturing functions are included in this table. One of these was exclusively a manufacturer and the other 3 only manufactured incidentally. The products manufactured, consisting of menhaden products, fish meal from ground fish, cod and cod-liver oil and oyster-shell products, were valued at $220,043.

HISTORICAL REVIEW

Twelve general surveys have been made for statistics of the fisheries of the New England States in the 50 years from 1879 to 1929. The catch in 1929, which amounted to 694,286,000 pounds exceeded that in any year for which there are records, surpassing the previous peak year of 1889. Comparative statistics of the catch of each of the more important species are shown in the following tables.

Fisheries of the New England States, 1879 to 1929

SUMMARY: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Year	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1880	----------	2, 742	----------	171	----------	7, 960	----------	697	----------	933	----------	12, 503
1887	131, 380	2, 365	4, 255	99	299, 544	6, 464	45, 285	684	39, 750	301	520, 214	9, 913
1888	132, 930	2, 292	3, 843	90	302, 046	6, 356	91, 687	825	42, 402	297	572, 908	9, 860
1889	129, 560	2, 111	4, 355	89	299, 218	5, 858	127, 365	935	92, 672	1, 558	653, 170	10, 551
1898	123, 405	2, 655	3, 021	49	202, 258	4, 464	32, 854	955	31, 920	1, 559	393, 458	9, 682
1902	242, 390	2, 919	1, 593	50	230, 646	6, 482	21, 614	1, 156	37, 832	1, 799	534, 075	12, 406
1905	124, 724	2, 386	1, 036	52	255, 655	7, 025	23, 896	1, 547	74, 973	3, 174	480, 284	14, 184
1908	173, 843	3, 257	677	53	244, 313	7, 095	44, 254	1, 752	66, 942	2, 982	530, 029	15, 139
1919	147, 956	3, 889	529	93	246, 951	10, 860	48, 251	3, 296	23, 653	1, 701	467, 340	19, 839
1924	116, 707	4, 137	447	56	243, 363	10, 799	20, 535	1, 819	25, 770	2, 007	406, 822	18, 818
1928	123, 326	4, 231	239	45	380, 169	15, 649	27, 666	2, 398	72, 198	3, 297	603, 598	25, 620
1929	162, 940	4, 897	378	52	447, 689	18, 053	28, 401	2, 435	54, 878	3, 636	694, 286	29, 073

NOTE.—It is possible that in some instances since 1889 a few of the above species are not shown by reason of being included under "Miscellaneous fish" or "All other species."

Fisheries of the New England States, 1879 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Alewives						Butterfish				
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	3, 751	(1)	(1)	--------	(1)	5	(1)	(1)	------
1880	(1)	425	(1)	2, 978	770	--------	(1)	(1)	(1)	(1)	------
1887	2, 526	100	4, 130	1, 430	18	8, 204	5	504	266	24	799
1888	2, 836	147	6, 292	1, 589	25	10, 889	(1)	513	283	38	------
1889	4, 022	140	3, 911	1, 387	53	9, 513	27	763	267	42	1, 099
1892	2, 276	50	3, 651	1, 190	681	7, 848	(1)	(1)	(1)	(1)	------
1896	3, 388	294	5, 356	2, 077	1, 001	12, 116	(1)	(1)	(1)	(1)	------
1897 (fiscal)	1, 249	239	4, 779	(1)	(1)	--------	(1)	(1)	(1)	(1)	------
1898	3, 619	325	2, 900	1, 012	868	8, 724	15	31	207	60	------
1902	3, 341	475	4, 517	705	1, 663	10, 701	8	106	363	67	544
1905	3, 082	122	4, 861	599	1, 232	9, 896	6	83	341	21	451
1908	2, 085	121	4, 062	288	1, 025	7, 581	6	67	1, 112	102	1, 287
1919	1, 296	--------	3, 064	270	177	4, 807	33	297	758	19	1, 107
1924	1, 583	--------	2, 593	391	116	4, 683	12	378	685	6	1, 081
1928	2, 132	--------	2, 248	161	16	4, 557	25	580	930	14	1, 549
1929	2, 821	58	1, 386	119	9	4, 393	53	800	1, 226	30	2, 109

Year	Cod						Cusk				
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Connecticut	Total
1879	(1)	(1)	172, 217	(1)	(1)	--------	(1)	(1)	989	(1)	------
1880	56, 004	5, 448	(1)	2, 584	2, 738	--------	(1)	38	(1)	--------	------
1887	45, 020	2, 156	157, 672	370	2, 240	207, 458	676	--------	444	--------	1, 120
1888	40, 252	1, 501	152, 166	360	2, 001	196, 280	715	--------	696	--------	1, 411
1889	29, 017	1, 569	131, 578	429	1, 530	164, 123	675	34	1, 230	--------	1, 939
1897 (fiscal)	11, 487	490	105, 644	(1)	(1)	--------	1, 168	63	3, 194	(1)	------
1898	20, 556	693	101, 999	1, 742	451	125, 441	1, 312	98	6, 082	--------	7, 492
1902	23, 878	442	98, 384	690	211	123, 605	2, 651	20	3, 049	--------	5, 720
1905	12, 261	342	79, 537	1, 097	555	93, 792	1, 675	--------	7, 934	--------	9, 609
1908	20, 013	135	72, 819	1, 497	820	95, 284	2, 078	--------	4, 267	--------	6, 345
1919	15, 062	98	72, 672	1, 148	96	89, 076	1, 046	2	1, 595	7	2, 650
1924	22, 443	98	69, 014	1, 357	539	93, 451	1, 569	1	2, 716	--------	4, 286
1928	16, 187	25	67, 666	2, 257	4, 201	90, 336	960	10	2, 185	75	3, 230
1929	17, 661	4	64, 146	2, 511	2, 677	86, 999	1, 281	5	3, 644	35	4, 965

Year	Flounders						Haddock					
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	571	(1)	(1)	--------	(1)	(1)	24, 093	(1)	(1)	--------
1880	(1)	(1)	(1)	352	143	--------	17, 729	644	(1)	(1)	(1)	--------
1887	659	--------	841	426	554	2, 480	8, 901	1, 020	30, 524	96	265	40, 806
1888	829	--------	853	558	542	2, 782	8, 659	1, 079	36, 810	96	244	46, 888
1889	829	--------	958	530	634	2, 951	7, 809	1, 650	36, 003	124	206	45, 792
1897 (fiscal)	(1)	(1)	(1)	(1)	(1)	--------	6, 112	302	33, 156	(1)	(1)	--------
1898	787	--------	1, 168	1, 710	444	4, 109	9, 188	1, 388	35, 711	367	113	46, 767
1902	569	--------	2, 596	1, 135	509	4, 809	7, 364	159	39, 812	506	189	48, 030
1905	97	--------	4, 046	1, 143	477	5, 763	8, 785	63	67, 975	516	294	77, 633
1908	31	--------	7, 124	1, 891	707	9, 753	10, 513	100	48, 492	415	24	59, 544
1919	470	8	10, 262	2, 452	2, 349	15, 541	11, 271	19	78, 553	10	(2)	89, 853
1924	343	--------	22, 997	3, 099	4, 416	30, 855	15, 559	144	77, 684	134	49	93, 570
1928	1, 175	4	36, 686	4, 401	8, 008	50, 274	12, 204	50	177, 578	577	47, 299	237, 708
1929	1, 570	1	34, 323	4, 789	8, 250	48, 933	14, 539	90	212, 881	579	27, 763	255, 852

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[1] Not available. Prior to 1889 some of these species were included under "Miscellaneous fish" or "All other species."

[2] Less than 500 pounds.

NOTE.—It is possible that in some instances since 1889 a few of the above species are not shown by reason of being included under "Miscellaneous fish" or "All other species."

Fisheries of the New England States, 1879 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Hake						Halibut					
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	8,438	(1)	(1)	-------	(1)	(1)	14,206	(1)	(1)	-------
1880	24,448	398	(1)	(1)	(1)	-------	(1)	25	(1)	(1)	830	-------
1887	14,060	200	6,071	-------	2	20,333	627	156	10,367	-------	472	11,622
1888	14,948	229	5,809	-------	2	20,988	551	143	11,882	-------	351	12,927
1889	13,333	447	7,209	-------	1	20,990	501	88	10,862	-------	265	11,716
1897 (fiscal)	9,290	316	11,093	(1)	(1)	-------	272	5	11,861	(1)	(1)	-------
1898	18,141	118	21,565	-------	-------	39,824	305	-------	12,383	-------	-------	12,688
1902	20,726	49	14,836	-------	-------	35,611	210	-------	13,366	-------	-------	13,576
1905	15,309	21	21,092	-------	2	36,424	118	-------	3,989	-------	85	4,192
1908	17,398	13	16,781	2	-------	34,194	200	-------	4,146	-------	8	4,354
1919	16,118	3	4,125	-------	10	20,256	219	-------	1,725	-------	25	1,969
1924	11,724	25	6,740	38	3	18,530	142	(2)	4,361	-------	-------	4,503
1928	7,681	10	9,322	112	381	17,506	191	-------	4,062	(2)	4	4,257
1929	10,074	32	15,869	104	293	26,372	239	-------	2,882	-------	132	3,253

Year	Herring						Mackerel					
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	7,795	(1)	(1)	-------	(1)	(1)	61,423	(1)	(1)	-------
1880	34,695	109	(1)	(1)	(1)	-------	31,694	2,573	(1)	89	1,304	-------
1887	33,570	228	9,019	-------	-------	42,817	5,568	211	26,255	943	122	33,099
1888	40,802	358	11,371	-------	-------	52,531	2,087	115	16,799	647	61	19,709
1889	32,156	20	10,937	-------	-------	43,113	1,176	55	8,222	704	55	10,212
1890	(1)	(1)	(1)	-------	-------	-------	3,514	108	6,984	339	-------	10,945
1891	(1)	(1)	(1)	-------	-------	-------	6,988	68	11,939	274	93	19,362
1892	40,814	147	12,103	1	-------	53,065	5,072	59	16,038	227	99	21,495
1897 (fiscal)	45,667	220	10,482	(1)	(1)	-------	2,674	91	14,385	(1)	(1)	-------
1898	46,596	65	19,463	2	-------	66,126	1,661	59	7,722	360	79	9,881
1902	165,136	100	35,362	-------	-------	200,598	1,840	100	20,300	616	300	23,156
1905	65,926	40	19,920	-------	-------	85,886	917	17	15,964	838	147	17,883
1908	92,985	-------	28,501	214	-------	121,700	380	-------	10,453	537	122	11,492
1919	86,979	-------	10,811	170	3	97,963	604	-------	13,954	1,576	91	16,225
1924	47,930	-------	13,180	507	(2)	61,617	2,310	-------	22,108	2,381	304	27,103
1928	64,685	-------	5,646	221	3	70,555	1,596	-------	37,161	2,696	1,269	42,722
1929	91,860	-------	12,999	2,364	-------	107,223	3,999	40	54,236	1,977	2,021	62,273

Year	Menhaden						Pollock					
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	26,066	(1)	(1)	-------	(1)	(1)	4,754	(1)	(1)	-------
1880	(1)	(1)	(1)	68,694	65,092	-------	(1)	76	(1)	(1)	20	-------
1887	702	-------	543	34,035	42,049	77,329	2,684	64	3,781	102	14	6,645
1888	3,125	21	4,968	78,270	43,966	130,350	3,375	38	5,006	101	14	8,534
1889	10,185	501	2,546	112,580	47,991	173,803	4,256	7	7,046	103	17	11,429
1892	83	4	250	10,761	22,947	34,045	(1)	(1)	(1)	(1)	(1)	-------
1897 (fiscal)	229	20	1,106	(1)	(1)	-------	2,378	158	7,330	(1)	(1)	-------
1898	7,860	-------	1,497	3,140	11,183	23,680	3,132	183	7,601	50	-------	10,966
1902	252	-------	875	471	16,877	18,475	6,419	158	13,439	30	4	20,050
1905	-------	-------	1,027	1,026	29,731	31,784	3,363	105	25,791	291	6	29,556
1908	-------	-------	258	17,942	28,636	46,836	8,941	6	20,006	266	25	29,244
1919	-------	-------	161	21,536	6,737	28,434	5,667	26	19,293	99	10	25,095
1924	1	-------	522	1,743	5,270	7,536	2,878	4	5,360	116	48	8,406
1928	-------	-------	4	1,727	3,444	5,175	2,876	5	7,701	167	290	11,039
1929	-------	-------	-------	133	262	395	2,217	13	11,578	131	318	14,257

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[1] Not available. Prior to 1889 some of these species were included under "Miscellaneous fish" or "All other species."

[2] Less than 500 pounds.

NOTE.—It is possible that in some instances since 1889 a few of the above species are not shown by reason of being included under "Miscellaneous fish" or "All other species."

Fisheries of the New England States, 1879 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Scup				Skates				
	Massachusetts	Rhode Island	Connecticut	Total	Maine	Massachusetts	Rhode Island	Connecticut	Total
1879	1,022	(1)	(1)	--------	(1)	(1)	(1)	(1)	--------
1880	(1)	6,691	930	--------	(1)	(1)	(1)	(1)	--------
1887	2,322	3,030	2	5,354	--------	--------	--------	--------	--------
1888	1,786	4,208	2	5,996	--------	--------	--------	--------	--------
1889	2,501	6,064	7	8,572	--------	--------	--------	--------	--------
1898	1,044	6,390	101	7,535	--------	--------	--------	--------	--------
1902	589	6,834	396	7,819	--------	--------	--------	--------	--------
1905	1,019	5,540	28	6,587	25	1	--------	--------	26
1908	1,136	4,616	95	5,847	--------	93	--------	--------	93
1919	79	8,261	2	8,342	2	101	--------	(2)	103
1924	158	1,192	2	1,352	--------	41	14	(2)	55
1928	855	2,004	(2)	2,859	(2)	33	621	404	1,058
1929	908	1,624	386	2,918	--------	67	893	296	1,256

Year	Smelt						Swordfish					
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	35	(1)	(1)	--------	(1)	(1)	732	(1)	(1)	------
1880	(1)	(1)	(1)	95	27	--------	(1)	20	(1)	90	74	------
1887	1,204	36	12	55	9	1,316	235	14	231	101	104	685
1888	1,279	36	11	62	10	1,398	442	43	264	217	181	1,147
1889	1,055	46	11	84	13	1,209	635	32	262	166	146	1,241
1892	1,617	31	3	38	9	1,698	--------	(1)	--------	(1)	(1)	------
1897 (fiscal)	(1)	(1)	(1)	(1)	(1)	--------	985	6	490	(1)	(1)	------
1898	1,608	--------	7	4	6	1,625	879	--------	624	56	86	1,645
1902	1,125	--------	--------	11	3	1,139	643	4	750	127	166	1,690
1905	589	--------	7	6	17	619	780	--------	1,703	362	451	3,296
1908	654	3	16	1	10	684	513	--------	1,642	308	240	2,703
1919	524	--------	39	--------	25	588	425	--------	712	101	88	1,326
1924	627	4	38	8	11	688	863	--------	1,733	206	80	2,882
1928	832	5	32	17	17	903	693	--------	2,731	774	168	4,366
1929	852	7	15	11	10	895	1,025	--------	4,457	472	115	6,069

Year	Whiting						Crabs					
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1887	------	--------	45	-----	2	47	--------	--------	--------	5	83	88
1888	------	--------	70	--------	17	87	--------	--------	--------	4	83	87
1889	------	--------	114	--------	12	126	--------	--------	--------	5	8	13
1898	------	--------	37	--------	4	41	--------	--------	--------	13	--------	13
1902	92	--------	2,286	104	31	2,513	--------	--------	--------	16	--------	16
1905	124	50	4,301	270	69	4,814	--------	--------	60	20	--------	80
1908	25	--------	5,589	534	179	6,327	--------	--------	123	146	--------	269
1919	691	--------	13,919	1,584	9	16,203	71	--------	1,765	34	--------	1,870
1924	70	--------	6,307	1,744	2	8,123	171	4	1,751	50	10	1,986
1928	4	--------	6,996	1,377	1	8,378	159	--------	3,139	275	182	3,755
1929	3	--------	7,872	2,403	--------	10,278	144	--------	4,371	260	174	4,949

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(1) Not available. Prior to 1889 some of these species were included under "Miscellaneous fish" or "All other species."

(2) Less than 500 pounds.

NOTE.—It is possible that in some instances since 1889 a few of the above species are not shown by reason of being included under "Miscellaneous fish" or "All other species."

Fisheries of the New England States, 1879 to 1922—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Lobsters						Squid				
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	4, 315	(1)	(1)	------	(1)	225	(1)	(1)	------
1880	14, 234	250	(1)	423	724	------	------	(1)	(1)	(1)	------
1887	22, 917	143	3, 511	570	1, 487	28, 628	------	511	------	------	------
1888	21, 696	136	3, 743	588	1, 477	27, 640	------	486	------	------	486
1889	25, 002	137	3, 354	456	1, 501	30, 450	------	568	------	------	568
1892	17, 643	196	3, 182	774	1, 615	23, 410	------	(1)	(1)	(1)	------
1897 (fiscal)	10, 301	90	2, 089	(1)	(1)	------	(1)	(1)	(1)	(1)	------
1898	11, 183	109	1, 694	578	1, 098	14, 662	------	1, 074	124	7	1, 205
1900	12, 347	205	1, 805	660	550	15, 567	(1)	(1)	(1)	(1)	------
1902	12, 163	128	1, 696	397	372	14, 756	------	5, 365	94	38	5, 497
1905	9, 018	256	1, 283	530	437	11, 524	------	786	133	26	945
1908	9, 929	264	2, 455	1, 425	661	14, 734	6	1, 837	292	21	2, 156
1913	7, 672	302	1, 524	1, 283	724	11, 505	(1)	(1)	(1)	(1)	------
1919	5, 546	298	2, 388	1, 694	741	10, 677	(2)	6, 135	378	4	6, 517
1924	5, 512	126	1, 680	1, 696	702	9, 716	2	2, 105	953	17	3, 077
1928	7, 100	130	2, 042	1, 638	694	11, 604	27	5, 540	2, 311	49	7, 927
1929	6, 620	125	1, 630	1, 354	593	10, 322	19	3, 506	2, 101	20	5, 646

Year	Clams, hard [3]					Clams, soft [4]					
	Maine	Massachusetts	Rhode Island	Connecticut	Total	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	88	(1)	(1)	------	(1)	(1)	1, 586	(1)	(1)	------
1880	------	(1)	------	------	------	3, 184	180	(1)	540	750	------
1887	1	284	154	151	590	6, 088	3	2, 307	258	267	8, 923
1888	1	209	265	151	626	6, 007	3	2, 438	308	266	9, 022
1889	1	135	237	171	544	8, 423	3	2, 518	334	264	11, 542
1892	------	(5)	(5)	(5)	------	4, 169	10	[6] 2, 418	[6] 489	[6] 380	7, 466
1898	------	510	250	234	994	9, 470	6	1, 471	150	200	11, 297
1902	------	855	217	151	1, 223	5, 546	30	2, 279	265	225	8, 345
1905	------	1, 332	182	54	1, 568	3, 728	28	2, 175	307	138	6, 376
1908	------	1, 119	162	100	1, 381	5, 061	------	1, 916	275	42	7, 294
1919	------	876	156	50	1, 082	2, 106	67	2, 187	404	229	4, 993
1924	1	1, 222	432	24	1, 679	3, 577	36	2, 520	82	44	6, 259
1928	------	1, 661	540	31	2, 232	3, 621	------	1, 797	14	38	5, 470
1929	------	1, 993	1, 416	39	3, 448	6, 717	------	2, 111	29	99	8, 956

Year	Oysters [7]						Scallops [8]				
	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total	Maine	Massachusetts	Rhode Island	Connecticut	Total
1879	(1)	(1)	252	(1)	(1)	------	(1)	42	(1)	(1)	------
1880	------	8	(1)	1, 306	2, 692	------	------	(1)	125	------	------
1887	------	------	302	1, 358	11, 009	12, 669	221	252	11	2	486
1888	------	------	319	1, 325	10, 569	12, 213	180	157	5	------	342
1889	------	------	259	1, 424	10, 401	12, 084	295	117	23	3	438
1892	------	------	454	1, 506	14, 911	16, 871	116	505	316	3	940
1897 (fiscal)	1	------	339	(1)	(1)	------	(1)	(1)	(1)	(1)	------
1898	------	------	709	3, 202	14, 633	18, 544	167	876	115	50	1, 208
1902	------	------	724	4, 256	14, 571	19, 551	115	397	120	14	646
1905	------	------	996	6, 413	25, 811	33, 220	415	263	2	------	680
1908	1	------	1, 084	8, 603	27, 636	37, 324	1, 257	502	4	------	1, 763
1910	------	------	2, 026	15, 878	23, 690	41, 594	------	(1)	(1)	(1)	------
1919	------	------	878	6, 262	12, 197	19, 337	73	1, 332	34	38	1, 477
1924	------	------	698	2, 584	8, 020	11, 302	296	699	271	2	1, 268
1928	------	------	1, 079	3, 248	5, 046	9, 373	326	1, 354	73	------	1, 753
1929	------	------	502	2, 327	8, 521	11, 350	359	1, 964	99	------	2, 422

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[1] Not available. Prior to 1889 some of these species were included under "Miscellaneous fish" or "All other species."

[2] Less than 500 pounds.

[3] Shown on the basis of 8 pounds of meat to the bushel.

[4] Shown on the basis of 10 pounds of meat to the bushel.

[5] Included with soft clams.

[6] Includes hard clams.

[7] Shown on the basis of 7 pounds of meat to the bushel.

[8] Shown on the basis of 6 pounds of meat to the bushel.

NOTE.—It is possible that in some instances since 1889 a few of the above species are not shown by reason of being included under "Miscellaneous fish" or "All other species."

VESSEL FISHERIES AT PRINCIPAL NEW ENGLAND PORTS

ECONOMIC ASPECT

The landings of fishery products at the three principal New England ports (Boston and Gloucester, Mass., and Portland, Me.) by vessels of 5 net tons and over, during 1930, amounted to 350,801,470 pounds as landed, valued at $12,785,452. This exceeded the amount landed for any year for which records are available, exceeding the amount landed in 1929 by 7 per cent. However, the value of the landings were 2 per cent less than the value of the fish landed in 1929. Of the total landings, 99 per cent consisted of fresh fish and 1 per cent of salted fish. The landings at Boston accounted for the lion's share of those landed at the three ports in 1930, accounting for 285,257,478 pounds, valued at $10,870,586, or 81 per cent of the total quantity. This is an increase over 1929 of 11 per cent in amount but only 1 per cent in value. Landings at Gloucester in 1930 amounted to 47,359,467 pounds, valued at $1,348,087, or 14 per cent of the total quantity. This is a decrease of 12 per cent in amount and 11 per cent in value compared with the amount and value of the landings at this port in 1929. At Portland, 18,184,525 pounds of fishery products, valued at $566,779 were landed. This was 5 per cent of the total landings at the three ports in 1930. It represents an increase of 4 per cent in amount, and a decrease of 7 per cent in value compared with the landings in 1929.

Species landed.—Among the landings of fresh fish, haddock far outranked other species in volume landed, the amount of all sizes in 1930 being 189,371,333 pounds, or 55 per cent of the total fresh fish. This is an increase of only 1 per cent over the amount landed in 1929. Of the total haddock landed 52 per cent were taken from Georges Bank, 26 per cent from South Channel, and 11 per cent from Browns Bank. The remainder (except for 9,593,470 pounds which were taken on banks off Canada) were taken from various other banks off the United States, principally on Nantucket Shoals and those near the shore.

Cod was of next importance, although a very poor second. The landings of all sizes of this species fresh amounted to 64,528,811 pounds, or 19 per cent of the total amount of fresh fish landed at the three ports in 1930. This is an increase of 30 per cent compared with the landings of fresh cod at the three ports in 1929. Cod was taken chiefly on Georges Bank, where 43 per cent of the catch was made. Considerable quantities were also taken on South Channel, Browns Bank, and various fishing banks along the shore.

Mackerel landings, fresh, amounted to 33,433,723 pounds at the three ports, or about 10 per cent of the total landings of fresh fish. This is a decrease of 11 per cent compared with the landings in 1929. This amount is 77 per cent of the total catch of mackerel by the United States Atlantic mackerel fleet.

Hake, with landings of 15,613,523 pounds, or 4 per cent of the total fresh-fish landings, ranked fourth in importance and increased 30 per cent over the landings of this species during the previous year.

Flounders, a species which have become popular in the fishery during the past few years, ranked fifth in importance among the fresh fish, with landings of 14,406,737 pounds. This is about 4 per cent of the total landings of the fresh fish, and an increase of 33 per cent compared with the landings during 1929.

Pollock, with landings fresh of 13,976,971 pounds, or about 4 per cent of the total landings of fresh fish in 1930, ranked sixth in importance, and increased 32 per cent over the previous year.

The landings of all other important varieties of fresh fish, amounting to a little over 4 per cent of the total, increased in 1930 over the respective amounts of their landings in 1929 except halibut and swordfish.

Among the salted fish, cod was the most important species, with landings of 2,087,021 pounds. This is 55 per cent of the total landings of all salted fish, and an increase of 86 per cent compared with the landings of this species in 1929.

The landings of salted herring, which usually has been the most important salted fish landed by volume during late years, amounted to 1,563,576 pounds, or 42 per cent of the total. This is a decrease of 56 per cent compared with the landings of this species in 1929.

The landings of salted hake, pollock, cusk, and halibut amounted to 30,837 pounds, and consisted mainly of salted cusk. This amount was 1 per cent of the total landings of salted fish at the three ports. Of this group only the landings of salted hake show a decrease compared with 1929. The landings of salted mackerel amounted to 78,895 pounds, or 2 per cent of the total landings of salted fish. This is a decrease of 64 per cent compared with the landings of this species salted in 1929.

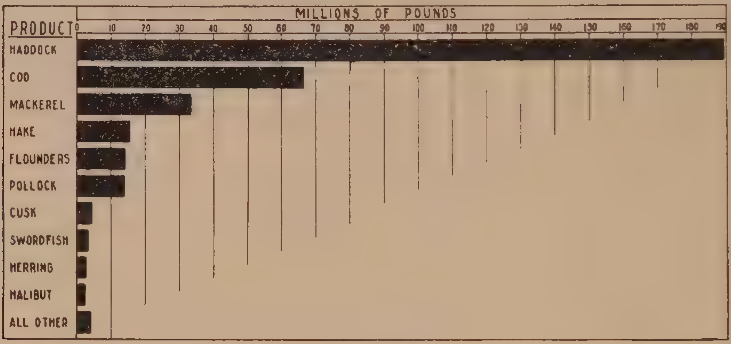

FIGURE 14.—Landings of fish by fishing vessels at the principal New England ports, 1930

Fishery by months.—During the first six months of the year the landings at the three ports were only slightly more than the landings during the latter six months. As a general rule the landings during the warmer months were larger than during the cooler months of the year. The total landings during the month of July were largest, and amounted to 40,978,410 pounds. Landings during September were second largest with 37,773,835 pounds, and those during April were third largest, amounting to 34,022,632 pounds. The smallest landings were made during December, and they amounted to 16,976,307 pounds. On an average slightly over 29,000,000 pounds were landed monthly.

The following table gives the economic statistics obtained on the landings of fishery products at Boston, Gloucester, and Portland during 1930, for vessels of 5 net tons and upward, as measured by the United States Customs Service. The weights of fresh and salted fish given in this table represent the weights as landed from the vessels. Many of the fresh fish landed were eviscerated on the vessels. This is true of the ground-fish group, except the flounders. Swordfish are eviscerated and beheaded. Fresh mackerel, flounders, and herring are landed in the round. Species included under "other" are generally landed in the round. Salted ground fish are landed eviscerated and beheaded; salted mackerel eviscerated and split; and salted herring, gibbed. The values are those received by the fisherman. The grades, or sizes given for certain species, are those recognized in the trade.

Landings by fishing vessels at principal New England ports, 1930

BOSTON: BY MONTHS

Species	January		February		March	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	1, 572, 844	$94, 326	3, 029, 131	$107, 733	3, 646, 374	$154, 927
Market	984, 756	39, 042	848, 127	26, 145	975, 909	34, 824
Scrod	63, 755	1, 767	14, 395	327	1, 180	25
Haddock, fresh:						
Large	13, 129, 908	678, 920	15, 921, 784	600, 544	20, 772, 354	878, 757
Scrod	799, 315	26, 317	781, 507	19, 194	861, 880	23, 744
Hake, fresh:						
Large	1, 554, 544	72, 542	1, 277, 030	49, 888	461, 740	22, 439
Small	4, 465	100	5, 400	175	100	2
Pollock, fresh	604, 883	17, 458	392, 877	15, 051	269, 700	11, 775
Cusk, fresh	770, 855	26, 934	449, 060	14, 171	276, 010	9, 201
Halibut, fresh	53, 319	17, 513	201, 009	39, 511	236, 941	47, 610
Flounders, fresh	1, 103, 252	81, 585	842, 058	62, 796	1, 446, 938	87, 922
Other, fresh	152, 489	6, 304	151, 950	7, 995	187, 603	8, 635
Total fresh	20, 794, 385	1, 062, 808	23, 914, 328	943, 530	29, 136, 729	1, 279, 861
Landed in 1929: Fresh	13, 339, 647	848, 211	20, 700, 565	1, 023, 205	21, 613, 963	907, 874

Species	April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	2, 946, 109	$96, 563	1, 944, 528	$54, 394	1, 913, 810	$77, 913	1, 778, 946	$70, 282
Market	1, 318, 540	31, 076	1, 891, 096	36, 865	2, 193, 520	49, 062	4, 384, 074	88, 835
Scrod	8, 135	112	5, 225	89	700	10	6, 300	86
Haddock, fresh:								
Large	18, 948, 871	497, 582	13, 175, 885	322, 286	11, 422, 300	362, 974	11, 535, 320	335, 836
Scrod	971, 875	14, 309	594, 010	7, 015	628, 500	9, 373	746, 255	9, 730
Hake, fresh:								
Large	681, 540	19, 984	286, 440	5, 462	601, 810	10, 456	933, 965	12, 161
Small	1, 060	74			12, 850	234	29, 200	455
Pollock, fresh	361, 895	9, 334	272, 705	4, 626	176, 519	6, 098	306, 750	6, 288
Cusk, fresh	266, 318	6, 700	147, 600	2, 534	38, 385	706	78, 945	1, 212
Halibut, fresh	311, 811	54, 816	454, 747	63, 267	288, 467	49, 704	333, 962	44, 800
Mackerel, fresh			3, 424, 960	118, 389	5, 020, 205	199, 783	7, 976, 377	188, 422
Mackerel, salted							42, 700	1, 835
Flounders, fresh	1, 451, 348	41, 269	957, 060	16, 125	1, 006, 081	29, 605	734, 312	24, 201
Swordfish, fresh					518, 198	127, 710	1, 384, 873	268, 811
Other, fresh	433, 005	10, 499	424, 030	4, 455	389, 419	8, 715	175, 657	4, 867
Total fresh	27, 700, 507	782, 318	23, 578, 286	635, 507	24, 210, 764	932, 343	30, 404, 936	1, 055, 986
Total salted							42, 700	1, 835
Grand total	27, 700, 507	782, 318	23, 578, 286	635, 507	24, 210, 764	932, 343	30, 447, 636	1, 057, 821
Landed in 1929:								
Fresh	19, 021, 660	580, 261	18, 495, 124	485, 587	22, 297, 780	823, 981	30, 350, 455	1, 138, 403
Salted			21, 070	1, 149	15, 400	766	3, 610	180
Total	19, 021, 660	580, 261	18, 516, 194	486, 736	22, 313, 180	824, 747	30, 354, 065	1, 138, 583

NOTE.—The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. Large cod are classified as those weighing over 10 pounds; market cod, 2½ to 10 pounds; and scrod cod, 1 to 2½ pounds. Large haddock are those weighing over 2½ pounds and scrod haddock, 1 to 2½ pounds. Large hake are those weighing over 6 pounds and small hake under 6 pounds. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation.

Landings by fishing vessels at principal New England ports, 1930—Continued

BOSTON: By months—Continued

Species	August		September		October	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	1, 544, 025	$60, 661	1, 674, 804	$69, 971	1, 736, 927	$87, 467
Market	4, 325, 475	92, 593	4, 927, 200	92, 934	3, 222, 374	103, 106
Scrod	2, 500	34	4, 575	43	4, 650	105
Haddock, fresh:						
Large	12, 161, 118	376, 643	15, 113, 105	405, 590	10, 259, 520	527, 162
Scrod	619, 735	9, 265	821, 417	10, 773	460, 275	12, 214
Hake, fresh:						
Large	1, 053, 355	14, 478	1, 160, 415	13, 900	1, 536, 740	36, 610
Small	15, 000	268	5, 800	91	6, 000	90
Pollock, fresh	373, 190	7, 047	433, 450	6, 292	478, 442	8, 206
Cusk, fresh	129, 345	1, 970	192, 746	2, 717	246, 297	5, 899
Halibut, fresh	226, 786	37, 007	215, 067	36, 874	122, 873	24, 574
Mackerel, fresh	2, 667, 770	141, 269	3, 612, 213	151, 680	655, 580	43, 228
Mackerel, salted	2, 000	80				
Flounders, fresh	710, 374	29, 560	1, 089, 670	44. 959	1, 215, 895	61, 238
Swordfish, fresh	772, 715	162, 807	328, 472	88, 459	74, 016	19, 135
Other, fresh	124, 736	5, 253	144, 721	5, 529	116, 099	8, 785
Total, fresh	24, 726, 124	938, 855	29, 723, 655	929, 812	20, 135, 688	937, 819
Total, salted	2, 000	80				
Grand total	24, 728, 124	938, 935	29, 723, 655	929, 812	20, 135, 688	937, 819
Landed in 1929:						
Fresh	28, 928, 497	1, 085, 720	26, 029, 462	957, 436	23, 057, 696	1, 144, 197
Salted			56, 300	3, 499	2, 400	156
Total	28, 928, 497	1, 085, 720	26, 085, 762	960, 935	23, 060, 096	1, 144, 353

Species	November		December		Total, 1930		1929	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	1, 108, 909	$56, 530	1, 171, 733	$62, 521	24, 068, 140	$993, 288	22, 918, 875	$1, 050, 845
Market	1, 578, 000	46, 938	1, 562, 775	49, 200	28, 211, 846	690, 620	15, 702, 681	450, 646
Scrod	5, 890	141	2, 200	37	119, 505	2, 776	221, 210	5, 056
Cod, salted:								
Large							35, 620	1, 881
Market							850	34
Haddock, fresh:								
Large	8, 687, 215	410, 661	8, 149, 550	441, 571	159, 276, 930	5, 838, 526	151, 587, 122	5, 794, 441
Scrod	301, 955	7, 697	234, 620	6, 538	7, 821, 344	156, 169	9, 112, 362	221, 764
Hake, fresh:								
Large	1, 900, 860	38, 823	1, 165, 810	40, 130	12, 614, 249	336, 873	10, 158, 606	350, 949
Small			1, 500	45	81, 375	1. 534	8, 052	151
Pollock, fresh	526, 535	6, 562	474, 063	8, 175	4, 671, 009	106, 912	4, 453, 072	122. 138
Pollock, salted							110	2
Cusk, fresh	430, 410	9, 031	385, 770	9, 059	3, 411, 741	90, 134	2, 702, 790	81, 368
Halibut, fresh	37, 209	8, 867	28, 162	7, 695	2, 510, 353	432, 238	2, 520, 506	459, 846
Mackerel, fresh	249, 164	24, 447	31, 410	3, 603	23, 637, 679	870, 821	21, 202, 032	908, 157
Mackerel, salted					44, 700	1, 915	62, 200	3, 833
Flounders, fresh	1, 161, 908	44, 185	1, 376, 508	72, 967	13, 095, 404	596, 412	9, 705, 514	490, 359
Swordfish, fresh					3, 078, 274	666, 922	4, 096, 085	735, 419
Herring, fresh							3, 750	62
Other, fresh	163, 552	8, 148	151, 668	6, 261	2, 614, 929	85, 446	1, 230, 517	59, 702
Total, fresh	16, 151, 607	662, 030	14, 735, 769	707, 802	285, 212, 778	10, 868, 671	255, 623, 174	10, 730, 903
Total, salted					44, 700	1, 915	98, 780	5, 750
Grand total	16, 151, 607	662, 030	14, 735, 769	707, 802	285, 257, 478	10, 870, 586	255, 721, 954	10, 736, 653
Landed in 1929:								
Fresh	17, 526, 368	812, 517	14, 261, 957	923, 511			255, 623, 174	10, 730, 903
Salted							98, 780	5, 750
Total	17, 526, 368	812. 517	14, 261, 957	923, 511			255, 721, 954	10, 736, 653

Landings by fishing vessels at principal New England ports, 1930—Continued

GLOUCESTER: BY MONTHS

Species	January		February		March		April	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	407, 492	$29, 266	318, 485	$12, 789	596, 860	$29, 049	1, 304, 965	$45, 174
Market	10, 200	342	15, 820	372	10, 905	285	72, 470	1, 571
Scrod	--------	--------	--------	--------	--------	--------	40	--------
Cod, salted:								
Large	--------	--------	--------	--------	--------	--------	65, 495	3, 283
Market	--------	--------	--------	--------	--------	--------	3, 520	137
Haddock, fresh:								
Large	284, 052	15, 195	1, 015, 380	30, 718	425, 360	15, 701	1, 873, 560	47, 816
Scrod	18, 900	659	57, 160	1, 053	23, 010	452	57, 470	746
Hake, fresh: Large	26, 291	1, 323	39, 057	1, 492	12, 535	660	10, 855	306
Pollock, fresh	1, 206, 666	32, 299	96, 950	3, 696	95, 885	4, 200	65, 035	1, 934
Cusk, fresh	100	3	560	11	980	25	2, 480	40
Halibut, fresh	136	45	1, 298	252	1, 169	271	559	102
Flounders, fresh	255, 485	14, 059	226, 920	11, 171	160, 595	10, 359	74, 990	2, 417
Herring, salted	1, 563, 576	58, 794	--------	--------	--------	--------	--------	--------
Other, fresh	1, 610	49	2, 879	85	1, 330	33	4, 470	66
Total, fresh	2, 210, 932	93, 240	1, 774, 509	61, 639	1, 328, 629	61, 035	3, 466, 894	100, 172
Total, salted	1, 563, 576	58, 794	--------	--------	--------	--------	69, 015	3, 420
Grand total	3, 774, 508	152, 034	1, 774, 509	61, 639	1, 328, 629	61, 035	3, 535, 909	103, 592
Landed in 1929:								
Fresh	1, 335, 806	95, 178	1, 982, 646	95, 075	2, 980, 480	115, 718	4, 990, 507	111, 489
Salted	1, 857, 832	70, 671	452, 856	17, 196	17, 310	651	36, 605	1, 637
Total	3, 193, 638	165, 849	2, 435, 502	112, 271	2, 997, 790	116, 369	5, 027, 112	113, 126

Species	May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	1, 935, 046	$25, 718	545, 045	$18, 601	457, 840	$13, 464
Market	533, 800	10, 583	182, 475	3, 609	548, 055	11, 092
Scrod	5, 785	61	425	4	1, 680	17
Cod, salted:						
Large	260, 705	12, 715	165, 255	8, 181	117, 220	5, 855
Market	18, 075	631	7, 140	281	19, 870	794
Haddock, fresh:						
Large	1, 684, 285	35, 056	1, 220, 864	35, 581	1, 717, 480	46, 243
Scrod	89, 220	888	60, 973	837	100, 650	1, 168
Hake, fresh: Large	48, 810	731	48, 755	719	168, 250	1, 977
Pollock, fresh	52, 505	981	5, 160	96	8, 140	112
Pollock, salted	175	5	115	2	630	13
Cusk, fresh	81, 510	1, 137	21, 140	390	85, 920	1, 535
Cusk, salted	650	16	1, 502	37	7, 050	162
Halibut, fresh	1, 436	203	1, 965	314	1, 794	226
Halibut, salted	110	13	--------	--------	2, 885	519
Mackerel, fresh	395, 245	8, 640	543, 330	16, 528	4, 546, 630	76, 079
Mackerel, salted	--------	--------	4, 130	176	27, 400	1, 015
Flounders, fresh	26, 515	303	25, 770	613	83, 831	1, 325
Swordfish, fresh	--------	--------	--------	--------	925	165
Herring, fresh	20, 600	206	--------	--------	--------	--------
Other, fresh	17, 545	160	14, 650	170	6, 990	78
Total, fresh	4, 892, 302	111, 667	2, 670, 552	77, 462	7, 728, 185	153, 481
Total, salted	279, 715	13, 380	178, 142	8, 677	175, 055	8, 358
Grand total	5, 172, 017	125, 047	2, 848, 694	86, 139	7, 903, 240	161, 839
Landed in 1929:						
Fresh	4, 048, 697	109, 990	4, 809, 028	128, 370	5, 844, 153	139, 823
Salted	196, 640	8, 827	438, 810	17, 953	121, 385	5, 898
Total	4, 245, 337	118, 817	5, 247, 838	146, 323	5, 965, 538	145, 721

Landings by fishing vessels at principal New England ports, 1930—Continued

GLOUCESTER: BY MONTHS—Continued

Species	August		September		October		November	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	179, 400	$4, 895	743, 355	$26, 365	440, 447	$23, 039	102, 267	$6, 061
Market	229, 285	4, 598	466, 215	9, 315	114, 652	2, 862	73, 113	1, 993
Scrod	7, 200	72	4, 355	50	110	5	525	10
Cod, salted:								
Large	173, 085	8, 922	404, 985	24, 166	149, 100	8, 731	----------	--------
Market	116, 793	5, 411	240, 652	12, 686	128, 072	6, 410	----------	--------
Scrod	3, 240	122	130, 813	5, 886	67, 401	2, 696	----------	--------
Haddock, fresh:								
Large	1, 845, 975	51, 026	1, 696, 165	43, 346	386, 042	13, 889	594, 169	26, 158
Scrod	88, 100	1, 075	109, 710	1, 253	24, 890	372	43, 045	798
Hake, fresh:								
Large	99, 210	1, 169	552, 905	5, 574	319, 278	7, 465	134, 597	2, 278
Small	----------	--------	----------	--------	4, 460	73	12, 725	303
Hake, salted: Large	3, 080	62	1, 150	17	----------	--------	----------	--------
Pollock, fresh	18, 387	301	324, 815	4, 100	772, 460	15, 518	4, 700, 075	61, 981
Pollock, salted	1, 235	29	950	21	50	1	----------	--------
Cusk, fresh	79, 770	1, 176	85, 745	1, 299	11, 760	202	3, 785	88
Cusk, salted	8, 260	206	530	16	60	1	----------	--------
Halibut, fresh	11, 020	1, 371	1, 855	211	107	12	1, 166	162
Mackerel, fresh	798, 435	20, 924	1, 976, 115	51, 465	227, 413	19, 152	492, 692	51, 876
Mackerel, salted	2, 000	80	----------	--------	----------	--------	----------	--------
Flounders, fresh	15, 575	685	13, 035	458	5, 195	213	46, 003	2, 506
Swordfish, fresh	338	74	200	41	1, 310	393	----------	--------
Herring, fresh	----------	--------	48, 400	484	8, 400	84	----------	--------
Other, fresh	41, 610	424	76, 165	1, 416	10, 348	623	17, 993	1, 178
Total, fresh	3, 414, 305	87, 790	6, 099, 035	145, 377	2, 326, 872	83, 902	6, 222, 155	155, 392
Total, salted	307, 693	14, 832	779, 080	42, 792	344, 683	17, 839	----------	--------
Grand total	3, 721, 998	102, 622	6, 878, 115	188, 169	2, 671, 555	101, 741	6, 222, 155	155, 392
Landed in 1929:								
Fresh	5, 123, 961	128, 104	8, 816, 777	215, 217	1, 898, 265	90, 097	4, 617, 650	163, 872
Salted	217, 020	9, 553	150, 580	8, 210	48, 177	2, 190	350	53
Total	5, 340, 981	137, 657	8, 967, 357	223, 427	1, 946, 442	92, 287	4, 618, 000	163, 925

Species	December		Total, 1930		1929	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	114, 490	$9, 506	7, 145, 692	$270, 927	7, 127, 570	$302, 280
Market	5, 200	141	2, 262, 190	46, 763	1, 574, 527	36, 672
Scrod	1, 250	8	21, 370	227	13, 415	274
Cod, salted:						
Large	----------	----------	1, 335, 845	71, 853	903, 810	41, 887
Market	----------	----------	534, 122	26, 350	154, 772	5, 097
Scrod	----------	----------	201, 454	8, 704	----------	----------
Haddock, fresh:						
Large	39, 470	2, 561	12, 782, 802	363, 290	17, 638, 817	562, 201
Scrod	585	20	673, 713	9, 321	1, 224, 930	24, 588
Hake, fresh:						
Large	152, 570	5, 558	1, 613, 113	29, 252	559, 754	15, 180
Small	----------	----------	17, 185	376	5, 630	205
Hake, salted:						
Large	----------	----------	4, 230	79	11, 440	267
Small	----------	----------	----------	----------	920	23
Pollock, fresh	1, 030, 260	16, 432	8, 376, 338	141, 650	5, 158, 011	103, 928
Pollock, salted	----------	----------	3, 155	71	2, 795	59
Cusk, fresh	1, 265	31	375, 015	5, 937	214, 675	3, 468
Cusk, salted	----------	----------	18, 052	438	9, 470	284
Halibut, fresh	----------	----------	22, 505	3, 169	46, 623	3, 847
Halibut, salted	----------	----------	2, 995	532	460	46
Mackerel, fresh	89, 008	10, 893	9, 068, 868	255, 557	14, 336, 562	410, 192
Mackerel, salted	----------	----------	33, 530	1, 271	143, 210	7, 309
Flounders, fresh	77, 275	3, 477	1, 011, 189	47, 586	664, 566	38, 283
Swordfish, fresh	----------	----------	2, 773	673	11, 181	1, 924
Herring, fresh	----------	----------	77, 400	774	79, 600	913
Herring, salted	----------	----------	1, 563, 576	58, 794	3, 518, 160	133, 516
Other, fresh	16, 765	211	212, 355	4, 493	479, 077	16, 153
Total, fresh	1, 528, 138	48, 838	43, 662, 508	1, 179, 995	49, 134, 938	1, 520, 108
Total, salted	----------	----------	3, 696, 959	168, 092	4, 745, 037	188, 488
Grand total	1, 528, 138	48, 838	47, 359, 467	1, 348, 087	53, 879, 975	1, 708, 596
Landed in 1929:						
Fresh	2, 686, 968	127, 175	----------	----------	49, 134, 938	1, 520, 108
Salted	1, 207, 472	45, 649	----------	----------	4, 745, 037	188, 488
Total	3, 894, 440	172, 824	----------	----------	53, 879, 975	1, 708, 596

Landings by fishing vessels at principal New England ports, 1930—Continued

PORTLAND: BY MONTHS

Species	January		February		March		April	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	80, 783	$4, 816	196, 494	$7, 419	89, 910	$4, 276	259, 557	$7, 137
Market	29, 933	1, 015	28, 960	906	37, 960	1, 121	37, 730	763
Scrod	4, 495	49	3, 815	43	6, 370	75	2, 630	29
Haddock, fresh:								
Large	205, 145	12, 143	1, 015, 420	38, 424	447, 331	17, 633	2, 177, 600	53, 036
Scrod	4, 891	56	8, 495	110	40, 135	, 005	3, 680	37
Hake, fresh:								
Large	180	7	---	---	525	19	2, 440	74
Small	59, 961	2, 051	27, 585	988	30, 200	993	25, 745	641
Pollock, fresh	26, 285	577	39, 067	855	50, 871	1, 363	43, 184	674
Cusk, fresh	103, 923	3, 483	80, 428	2, 831	59, 553	1, 980	93, 970	2, 216
Halibut, fresh	172	49	1, 702	316	984	222	5, 741	945
Flounders, fresh	27, 877	1, 139	24, 695	1, 103	19, 937	597	57, 221	671
Other, fresh	30, 497	687	29, 755	716	50, 24.	1, 277	76, 718	1, 223
Total, fresh	574, 142	26, 072	1, 456, 416	53, 711	834, 017	30, 561	2, 786, 216	67, 446
Landed in 1929: Fresh	539, 220	35, 251	1, 340, 799	56, 923	1, 140, 282	40, 622	2, 507, 924	51, 074

Species	May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	363, 925	$9, 260	120, 042	$5, 207	199, 976	$7, 689
Market	94, 875	2, 170	81, 298	2, 177	155, 569	3, 734
Scrod	920	9	3, 055	30	1, 320	13
Cod, salted						
Large	10, 440	522	---	---	---	---
Market	260	10	---	---	---	---
Haddock, fresh:						
Large	1, 809, 280	43, 620	557, 393	17, 332	1, 055, 851	29, 592
Scrod	25, 540	630	36, 490	788	50, 933	1, 033
Hake, fresh:						
Large	---	---	5, 430	106	275	3
Small	37, 235	508	53, 243	788	67, 363	890
Pollock, fresh	79, 135	839	23, 062	408	31, 280	478
Pollock, salted	70	1	---	---	---	---
Cusk, fresh	16, 507	254	3, 429	58	2, 294	43
Halibut, fresh	16, 374	2, 577	7, 008	1, 163	7, 344	934
Halibut, salted	2, 335	23	---	---	---	---
Mackerel, fresh	69, 228	2, 346	153, 731	3, 845	278, 283	6, 102
Mackerel, salted	---	---	---	---	665	13
Flounders, fresh	27, 370	251	61, 085	922	45, 487	941
Swordfish, fresh	---	---	35, 106	7, 211	170, 593	31, 548
Herring, fresh	40, 800	417	272, 150	3, 615	264, 100	3, 216
Other, fresh	35, 053	548	33, 155	509	296, 201	4, 280
Total, fresh	2, 616, 242	63, 429	1, 445, 677	44, 159	2, 626, 869	90, 496
Total, salted	13, 105	556	---	---	665	13
Grand total	2, 629, 347	63, 985	1, 445, 677	44, 159	2, 627, 534	90, 509
Landed in 1929:						
Fresh	865, 178	19, 533	932, 871,	39, 274	1, 878, 288	91, 047
Salted	12, 240	493	19, 715	850	2, 245	92
Total	877, 418	20, 026	952, 586	40, 124	1, 880, 533	91, 139

Landings by fishing vessels at principal New England ports, 1930—Continued

PORTLAND: BY MONTHS—Continued

Species	August		September		October		November	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:								
Large	116,933	$5,809	171,440	$7,322	206,865	$10,753	92,037	$4,345
Market	36,310	766	30,305	597	43,737	1,292	39,220	1,015
Scrod	1,458	15	3,490	34	7,535	76	9,345	95
Cod, salted: Large	4,900	196	----------	--------	----------	--------	----------	--------
Haddock, fresh:								
Large	294,346	11,197	299,570	9,949	234,711	13,902	239,509	12,805
Scrod	20,627	267	9,971	100	7,811	81	10,849	106
Hake, fresh:								
Large	520	8	13,920	165	77,025	1,541	55,183	1,081
Small	40,943	587	189,884	2,308	283,446	6,020	166,667	3,122
Pollock, fresh	35,427	699	67,790	1,138	284,097	4,916	164,994	2,161
Cusk, fresh	964	19	62,236	826	81,252	1,831	58,442	1,176
Halibut, fresh	635	87	1,038	239	960	176	745	136
Mackerel, fresh	111,690	5,857	98,222	8,111	----------	--------	16,022	1,769
Flounders, fresh	13,640	455	60	1	9,815	637	7,652	412
Swordfish, fresh	74,656	15,053	19,632	4,542	----------	--------	----------	--------
Herring, fresh	54,000	338	164,200	1,331	85,700	561	200,800	1,179
Other, fresh	629,540	8,702	40,307	858	79,116	1,713	46,587	1,005
Total, fresh	1,431,689	49,859	1,172,065	37,521	1,402,070	43,499	1,108,052	30,407
Total, salted	4,900	196	----------	--------	----------	--------	----------	--------
Grand total	1,436,589	50,055	1,172,065	37,521	1,402,070	43,499	1,108,052	30,407
Landed in 1929:								
Fresh	1,856,630	63,301	2,440,945	70,548	1,700,169	55,646	1,606,967	46,591
Salted	15,350	314	----------	--------	----------	--------	----------	--------
Total	1,871,980	63,615	2,440,945	70,548	1,700,169	55,646	1,606,967	46,591

Species	December		Total, 1930		1929	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	89,959	$4,395	1,987,921	$78,428	1,621,493	$76,837
Market	44,608	1,308	660,505	16,864	305,127	10,357
Scrod	7,209	72	51,642	540	37,986	290
Cod, salted:						
Large	----------	--------	15,340	718	24,290	1,155
Market	----------	--------	260	10	4,415	164
Haddock, fresh:						
Large	253,230	14,555	8,589,386	274,188	7,544,695	241,412
Scrod	7,736	79	227,158	4,292	95,807	850
Hake, fresh:						
Large	12,830	464	168,328	3,468	19,065	641
Small	137,001	4,383	1,119,273	23,279	1,285,927	37,598
Hake, salted:						
Large	----------	--------	----------	--------	880	18
Small	----------	--------	----------	--------	1,130	21
Pollock, fresh	84,432	1,070	929,624	15,178	950,887	17,409
Pollock, salted	----------	--------	70	1	----------	--------
Cusk, fresh	65,609	2,005	628,607	16,722	553,505	17,768
Cusk, salted	----------	--------	----------	--------	2,400	58
Halibut, fresh	637	146	43,340	6,990	128,259	20,804
Halibut, salted	----------	--------	2,335	23	----------	--------
Mackerel, fresh	----------	--------	727,176	28,030	1,982,969	52,532
Mackerel, salted	----------	--------	665	13	16,535	334
Flounders, fresh	5,305	283	300,144	7,412	417,685	15,361
Swordfish, fresh	----------	--------	299,987	58,354	485,696	83,400
Herring, fresh	----------	--------	1,081,750	10,657	954,500	9,108
Other, fresh	3,844	94	1,351,014	21,612	1,061,147	20,338
Total, fresh	712,400	28,854	18,165,855	566,014	17,444,748	604,705
Total, salted	----------	--------	18,670	765	49,650	1,750
Grand total	712,400	28,854	18,184,525	566,779	17,494,398	606,455
Landed in 1929:						
Fresh	635,475	34,895	----------	--------	17,444,748	604,705
Salted	100	1	----------	--------	49,650	1,750
Total	635,575	34,896	----------	--------	17,494,398	606,455

Landings by fishing vessels at principal New England ports, 1930—Continued

SUMMARY: BY PORTS

Species	Boston		Gloucester		Portland	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:						
Large	24, 068, 140	$993, 288	7, 145, 692	$270, 927	1, 987, 921	$78, 428
Market	28, 211, 846	690, 620	2, 262, 190	46, 763	660, 505	16, 864
Scrod	119, 505	2, 776	21, 370	227	51, 642	540
Cod, salted:						
Large	----------	----------	1, 335, 845	71, 853	15, 340	718
Market	----------	----------	534, 122	26, 350	260	10
Scrod	----------	----------	201, 454	8, 704	----------	----------
Haddock, fresh:						
Large	159, 276, 930	5, 838, 526	12, 782, 802	363, 290	8, 589, 386	274, 188
Scrod	7, 821, 344	156, 169	673, 713	9, 321	227, 158	4, 292
Hake, fresh:						
Large	12, 614, 249	336, 873	1, 613, 113	29, 252	168, 328	3, 468
Small	81, 375	1, 534	17, 185	376	1, 119, 273	23, 279
Hake, salted: Large	----------	----------	4, 230	79	----------	----------
Pollock, fresh	4, 671, 009	106, 992	8, 376, 338	141, 650	929, 624	15, 178
Pollock, salted	----------	----------	3, 155	71	70	1
Cusk, fresh	3, 411, 741	90, 134	375, 015	5, 937	628, 607	16, 722
Cusk, salted	----------	----------	18, 052	438	----------	----------
Halibut, fresh	2, 510, 353	432, 238	22, 505	3, 169	43, 340	6, 990
Halibut, salted	----------	----------	2, 995	532	2, 335	23
Mackerel, fresh	23, 637, 679	870, 821	9, 068, 868	255, 557	727, 176	28, 030
Mackerel, salted	44, 700	1, 915	33, 530	1, 271	665	13
Flounders, fresh	13, 095. 404	596, 412	1, 011, 189	47, 586	300, 144	7, 412
Swordfish, fresh	3, 078, 274	666, 922	2, 773	673	299, 987	58, 354
Herring, fresh	----------	----------	77, 400	774	1, 081, 750	10, 657
Herring, salted	----------	----------	1, 563, 576	58, 794	----------	----------
Other, fresh	2, 614. 929	85, 446	212, 355	4, 493	1, 351, 014	21, 612
Total, fresh	285, 212, 778	10, 868, 671	43, 662, 508	1, 179, 995	18, 165, 855	566, 014
Total, salted	44, 700	1, 915	3, 696, 959	168, 092	18, 670	765
Grand total	285, 257, 478	10, 870, 586	47, 359, 467	1, 348, 087	18, 184, 525	566, 779
Landed in 1929:						
Fresh	255, 623, 174	10, 730, 903	49, 134, 938	1, 520, 108	17, 444, 748	604, 705
Salted	98, 780	5, 750	4, 745, 037	188, 488	49, 650	1, 750
Total	255, 721, 954	10, 736, 653	53, 879, 975	1, 708, 596	17, 494, 398	606, 455

Species	Total, 1930		1929	
	Pounds	*Value*	*Pounds*	*Value*
Cod, fresh:				
Large	33, 201, 753	$1, 342, 643	31, 667, 938	$1, 429, 962
Market	31, 134, 541	754, 247	17, 582, 335	497, 675
Scrod	192, 517	3, 543	272, 611	5, 620
Cod, salted:				
Large	1, 351, 185	72, 571	963, 720	44, 923
Market	534, 382	26, 360	160, 037	5, 295
Scrod	201, 454	8, 704	----------	----------
Haddock, fresh:				
Large	180, 649, 118	6, 476, 004	176, 770, 634	6, 598, 054
Scrod	8, 722, 215	169, 782	10, 433, 099	247, 202
Hake, fresh:				
Large	14, 395, 690	369, 593	10, 737, 425	366, 770
Small	1, 217, 833	25, 189	1, 299, 609	37, 954
Hake, salted:				
Large	4, 230	79	12, 320	285
Small	----------	----------	2, 050	44
Pollock, fresh	13, 976, 971	263, 740	10, 561, 970	243, 475
Pollock, salted	3, 225	72	2, 905	61
Cusk, fresh	4, 415, 363	112, 793	3, 470, 970	102, 604
Cusk, salted	18, 052	438	11, 870	342
Halibut, fresh	2, 576, 198	442, 397	2, 695, 388	484, 497
Halibut, salted	5, 330	555	460	46
Mackerel, fresh	33, 433, 723	1, 154, 408	37, 521, 563	1, 370, 881
Mackerel, salted	78, 895	3, 199	221, 945	11, 476
Flounders, fresh	14, 406, 737	651, 410	10, 787, 765	544. 003
Swordfish, fresh	3, 381, 034	725, 949	4, 592. 962	820, 743
Herring, fresh	1, 159, 150	11, 431	1, 037, 850	10, 083
Herring, salted	1, 563, 576	58, 794	3, 518, 160	133, 516
Other, fresh	[1] 4, 178, 298	111, 551	2, 770, 741	96, 193
Total, fresh	347, 041, 141	12, 614, 680	322, 202, 860	12, 855, 716
Total, salted	3, 760, 329	170, 772	4, 893. 467	195, 988
Grand total	350, 801, 470	12, 785, 452	327, 096, 327	13, 051, 704
Landed in 1929:				
Fresh	----------	----------	322, 202, 860	12, 855, 716
Salted	----------	----------	4, 893, 467	195, 988
Total	----------	----------	327, 096, 327	13, 051, 704

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[1] The items under "Other" include bluebacks, 913,145 pounds, value $12,409; bonito, 95 pounds, value $8; butterfish, 220,713 pounds, value $19,295; eels, 1,565 pounds, value $156; perch or "cunner," 2,862 pounds, value $161: rosefish, 85,170 pounds, value $1,622; salmon, 82 pounds, value $10; sea robins, 905 pounds, value $22; shad, 86,895 pounds, value $1,832; sharks, 44,323 pounds, value $1,622; skates, 42,940 pounds, value $520; smelt, 50 pounds, value $2; sturgeon, 7,772 pounds, value $930; tuna, 1,570 pounds, value $265; whiting, 125,430 pounds, value $4,771; wolffish, 2,192,382 pounds, value $49,990; lobsters, 36 pounds, value $15; scallops, 21,952 pounds, value $4,252; squid 1,500 pounds, value $5; spearfish, 85 pounds, value $11; goosefish, 1,700 pounds, value $18; porpoise, 140 pounds, value $2; livers, 322,800 pounds ,value $6,463; spawn, 103,776 pounds, value $7,166; and sounds, 410 pounds, value $4.

Landings by fishing vessels at Boston, Gloucester, and Portland, 1893 to 1930

BY SPECIES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Cod		Haddock		Hake		Pollock	
	Fresh	Salted	Fresh	Salted	Fresh	Salted	Fresh	Salted
1893	20, 254	34, 373	33, 865	44	19, 754	238	3, 453	161
1894	27, 762	35, 829	45, 608	4	23, 305	39	2, 175	6
1895	24, 071	43, 228	41, 578	28	15, 176	165	2, 356	122
1896	25, 448	34, 040	30. 167	----------	10, 526	18	1, 908	255
1897	27, 238	25, 757	30, 978	----------	14, 679	18	1, 891	----------
1898	31, 674	26, 485	32, 482	37	17, 502	19	4, 464	20
1899	48, 294	36, 906	33, 291	15	16, 657	53	7, 343	144
1900	34, 051	29, 969	33, 043	6	11, 445	78	5, 278	41
1901	35, 972	29, 719	28, 930	46	11, 121	148	7, 345	98
1902	36, 373	30, 248	38, 395	2	14, 264	134	12, 580	16
1903	30, 557	27, 195	40, 339	4	14, 769	78	11, 290	154
1904	30, 636	21, 443	47, 509	532	21, 887	237	10, 521	637
1905	36, 137	17, 852	65, 897	423	22, 781	457	20, 409	1, 646
1906	36, 196	18, 323	61, 195	400	13, 027	260	8, 522	988
1907	45, 953	15, 368	41, 815	463	19, 580	214	20, 428	776
1908	41, 615	21, 832	47, 418	641	20, 434	122	12, 429	1, 090
1909	38, 590	32, 744	42, 401	425	13, 163	113	12, 502	1, 381
1910	35, 549	25, 790	49, 227	340	19, 759	189	18, 808	816
1911	33, 977	19, 729	55, 711	464	18, 097	355	14, 747	879
1912	35, 519	18, 186	63, 225	323	15, 289	270	14, 359	307
1913	29, 177	15, 688	53, 436	237	13, 740	345	15, 031	236
1914	36, 080	11, 450	57, 599	155	12, 531	222	12, 243	211
1915	34, 088	10, 968	57, 813	131	14, 589	301	12, 961	235
1916	35, 993	7, 629	60, 371	184	13, 029	143	15, 502	101
1917	49, 873	6, 574	53, 395	160	7, 839	75	14, 467	40
1918	68, 338	3, 487	66, 603	68	5, 246	35	26, 507	53
1919	60, 651	4, 723	82, 561	155	4, 300	40	18, 696	56
1920	58, 407	3, 858	75, 235	45	4, 666	55	8, 539	22
1921	48, 106	5, 409	67, 397	15	4, 494	42	6, 893	52
1922	50, 174	5, 006	70, 065	131	5, 341	33	5, 048	49
1923	58, 232	4, 443	73, 718	44	6, 315	33	4, 766	39
1924	58, 656	2, 793	79, 897	5	7, 263	22	5, 067	18
1925	64, 097	3, 153	91, 861	25	5, 789	17	5, 243	47
1926	73, 637	4, 582	93, 983	77	5, 482	23	6, 705	34
1927	61, 367	1, 987	128, 543	50	5, 845	17	7, 652	11
1928	58, 155	1, 147	155, 322	8	8, 411	11	8, 032	9
1929	49, 523	1, 124	187, 204	----------	12, 037	14	10, 562	3
1930	64, 529	2, 087	189, 371	----------	15, 614	4	13, 977	3

Year	Cusk		Halibut		Mackerel		Flounders
	Fresh	Salted	Fresh	Salted	Fresh	Salted	Fresh
1893	9, 110	174	7, 964	1, 829	552	8, 744	----------
1894	10, 454	191	9, 378	1, 527	936	7, 077	----------
1895	5, 566	255	8, 660	1, 062	553	4, 033	----------
1896	3, 322	305	9, 689	1, 207	1, 136	10, 484	----------
1897	3, 049	144	8, 329	1, 572	1, 146	1, 784	----------
1898	4, 918	107	8, 381	1, 997	874	2, 222	----------
1899	3, 411	228	8, 236	789	1, 230	3, 862	----------
1900	2, 018	131	7, 275	1, 569	8, 889	15, 966	----------
1901	2, 029	52	5, 065	463	2, 783	12, 013	----------
1902	1, 785	21	6, 326	753	2, 772	8, 139	----------
1903	2, 881	78	3, 622	832	2, 040	8, 032	----------
1904	5, 414	236	2, 437	853	2, 182	5, 184	----------
1905	8, 797	231	2, 952	515	3, 499	5, 645	----------
1906	5, 101	230	4, 019	636	1, 740	2, 100	----------
1907	7, 027	72	3, 293	904	4, 091	6, 386	----------
1908	5, 067	141	3, 179	947	5, 508	3, 467	----------
1909	3, 148	185	3, 589	860	4, 121	3, 458	----------
1910	4, 504	191	2, 988	1, 036	583	610	----------
1911	6, 433	248	3, 091	411	3, 099	1, 439	----------
1912	6, 317	163	3, 060	481	2, 660	1, 548	----------
1913	5, 816	144	4, 756	532	4, 293	1, 383	400
1914	5, 747	112	3, 063	317	3, 980	2, 708	863
1915	6, 236	95	3, 584	286	7, 345	3, 574	652
1916	6, 017	52	3, 364	95	10, 832	5, 075	1, 292
1917	3, 525	24	1, 724	42	12, 032	5, 410	1, 280
1918	2, 644	14	1, 770	11	7, 583	2, 576	2, 270
1919	2, 025	38	2, 100	15	4, 315	1, 398	2, 452
1920	1, 849	6	3, 768	22	6, 284	1, 008	3, 638
1921	2, 060	38	5, 618	48	2, 735	650	2, 605
1922	2, 194	54	5, 608	16	4, 266	460	3, 281

Landings by fishing vessels at Boston, Gloucester, and Portland, 1893 to 1930—Continued

BY SPECIES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Cusk		Halibut		Mackerel		Flounders
	Fresh	Salted	Fresh	Salted	Fresh	Salted	Fresh
1923	2,911	87	4,873	2	10,684	881	3,437
1924	3,344	62	4,422	1	8,474	1,283	4,335
1925	3,606	107	3,553	8	24,115	2,095	6,638
1926	2,694	34	3,426	5	35,123	1,109	6,779
1927	2,693	34	4,773	6	31,354	176	8,359
1928	2,350	7	3,382	4	24,165	88	10,414
1929	3,471	12	2,695	(1)	37,521	222	10,788
1930	4,415	18	2,576	5	33,434	79	14,407

Year	Herring		Swordfish		Other		Total	
	Fresh	Salted	Fresh	Salted	Fresh	Salted	Fresh	Salted
1893	----------	----------	----------	----------	1,045	837	95,996	46,400
1894	799	1,224	417	----------	285	99	121,119	45,996
1895	----------	----------	----------	----------	1,717	1,869	99,677	50,762
1896	----------	----------	----------	----------	1,549	620	83,745	46,929
1897	----------	----------	----------	----------	8,354	2,926	95,664	31,201
1898	6,138	4,244	----------	----------	1,448	392	107,881	35,523
1899	6,082	7,412	----------	----------	2,730	91	127,274	49,500
1900	----------	----------	----------	----------	5,184	7,276	107,183	55,036
1901	1,719	10,030	----------	----------	1,475	2,157	96,439	54,726
1902	2,637	10,023	----------	----------	2,091	1,395	117,223	50,731
1903	3,097	7,887	----------	----------	2,847	1,790	111,442	46,050
1904	2,917	16,270	2,151	3	117	----------	125,771	45,395
1905	6,882	8,569	2,009	----------	172	14	169,535	35,352
1906	5,273	10,935	928	----------	517	12	136,518	33,884
1907	5,402	15,614	2,044	----------	2,142	----------	151,775	39,797
1908	6,708	8,629	1,358	----------	880	----------	144,596	36,869
1909	4,421	9,278	1,637	----------	1,059	27	124,631	48,471
1910	4,994	14,720	1,039	----------	592	----------	138,043	43,692
1911	6,399	16,752	1,503	----------	1,807	11	144,864	40,288
1912	5,885	10,005	1,810	----------	3,297	----------	151,421	31,283
1913	2,070	9,677	2,376	5	2,875	----------	133,970	28,247
1914	4,910	5,839	1,500	----------	3,059	----------	141,575	21,014
1915	4,346	8,931	2,239	----------	3,222	(1)	147,075	24,521
1916	11,410	7,223	1,773	----------	5,732	1	165,321	20,503
1917	6,817	6,322	1,973	----------	3,858	----------	156,783	18,647
1918	8,764	6,233	1,034	----------	2,265	----------	193,024	12,477
1919	6,858	3,502	883	----------	1,702	11	186,543	9,938
1920	3,901	3,097	2,532	----------	1,348	----------	170,167	8,113
1921	2,262	351	1,598	----------	491	1	144,259	6,606
1922	752	1,892	3,282	----------	2,178	44	152,189	7,685
1923	264	1,219	2,455	----------	561	9	168,216	6,746
1924	1,467	2,943	2,023	----------	873	----------	175,821	7,127
1925	1,542	2,400	1,527	----------	1,046	----------	209,017	7,852
1926	1,266	315	2,442	----------	710	----------	232,247	6,179
1927	2,735	4,410	2,246	----------	1,591	----------	257,158	6,691
1928	706	1,411	2,544	----------	1,816	----------	275,297	2,685
1929	1,038	3,518	4,593	----------	2,771	----------	322,203	4,893
1930	1,159	1,564	3,381	----------	4,178	----------	347,041	3,760

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[1] Less than 500 pounds.

Landings by fishing vessels at principal New England ports, 1930—Continued

BY PORTS

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Boston		Gloucester		Portland		Total	
	Fresh	Salted	Fresh	Salted	Fresh	Salted	Fresh	Salted
1893	66, 518	1, 077	29, 478	45, 323	----------	----------	95, 996	46, 400
1894	86, 129	1, 335	34, 990	44, 661	----------	----------	121, 119	45, 996
1895	73, 612	195	26, 065	50, 567	----------	----------	99, 677	50, 762
1896	61, 820	1, 256	21, 925	45, 673	----------	----------	83, 745	46, 929
1897	62, 704	199	32, 960	31, 002	----------	----------	95, 664	31, 201
1898	53, 494	1, 186	54, 387	34, 337	----------	----------	107, 881	35, 523
1899	63, 450	1, 274	63, 824	48, 226	----------	----------	127, 274	49, 500
1900	63, 648	3, 173	43, 535	51, 863	----------	----------	107, 183	55, 036
1901	56, 855	2, 137	39, 584	52, 589	----------	----------	96, 439	54, 726
1902	77, 608	1, 365	39, 615	49, 366	----------	----------	117, 223	50, 731
1903	78, 383	1, 883	33, 059	44, 167	----------	----------	111, 442	46, 050
1904	81, 183	911	44, 588	44, 484	----------	----------	125, 771	45, 395
1905	101, 085	222	68, 450	35, 130	----------	----------	169, 535	35, 352
1906	89, 610	83	46, 908	33, 801	----------	----------	136, 518	33, 884
1907	87, 717	394	64, 058	39, 403	----------	----------	151, 775	39, 797
1908	94, 713	947	49, 883	35, 922	----------	----------	144, 596	36, 869
1909	92, 085	491	32, 546	47, 980	----------	----------	124, 631	48, 471
1910	102, 059	31	35, 984	43, 661	----------	----------	138, 043	43, 692
1911	93, 629	131	51, 235	40, 157	----------	----------	144, 864	40, 288
1912	100, 157	143	51, 264	31, 140	----------	----------	151, 421	31, 283
1913	92, 202	149	41, 768	28, 098	----------	----------	133, 970	28, 247
1914	92, 231	113	49, 344	20, 901	----------	----------	141, 575	21, 014
1915	97, 397	502	49, 678	24, 019	----------	----------	147, 075	24, 521
1916	98, 255	76	46, 515	20, 165	20, 551	262	165, 321	20, 503
1917	98, 155	495	40, 062	18, 073	18, 566	79	156, 783	18, 647
1918	109, 227	249	62, 002	12, 173	21, 795	55	193, 024	12, 477
1919	103, 209	183	61, 621	9, 749	21, 713	6	186, 543	9, 938
1920	118, 302	257	39, 113	7, 627	12, 752	229	170, 167	8, 113
1921	104, 277	91	26, 747	6, 269	13, 235	246	144, 259	6, 606
1922	106, 032	158	30, 395	7, 355	15, 762	172	152, 189	7, 685
1923	123, 982	253	29, 012	6, 018	15, 222	475	168, 216	6, 746
1924	130, 631	335	29, 263	6, 583	15, 927	209	175, 821	7, 127
1925	148, 723	315	42, 161	7, 311	18, 133	226	209, 017	7, 852
1926	167, 061	257	49, 222	5, 679	15, 964	243	232, 247	6, 179
1927	194, 877	64	46, 056	6, 497	16, 225	130	257, 150	6, 691
1928	218, 353	34	39, 407	2, 497	17, 536	154	275, 297	2, 685
1929	255, 623	99	49, 135	4, 745	17, 445	50	322, 203	4, 893
1930	285, 212	45	43, 663	3, 696	18, 166	19	347, 041	3, 760

NOTE.—Prior to 1916, Portland landings are lacking.

BIOLOGICAL ASPECT

The fishing grounds of the North Atlantic, extending from Flemish Cap in 40° 06′ west longitude and 47° north latitude for a distance of about 2,000 miles to New York, provide an almost continuous extent of most productive fishing grounds. Fishing vessels landing fares at Boston and Gloucester, Mass., and Portland, Me., make their catches on certain of these grounds.

In 1930 the fishing fleet landing fares at these three New England ports, and operating on the above-mentioned banks, numbered 441 steam, motor, and sail vessels, of over 5 net tons, as measured by the United States Customs Service. These made 12,494 trips to the fishing grounds, and were absent from port 61,461 days, or on the average about 4.9 days per trip. This is 0.2 of a day longer than the average length of a trip in 1929. Their catches of edible fish landed at the three ports amounted to 353,554,965 pounds when the salted fish had been converted to the basis of fresh gutted or round fish as landed. This does not represent the entire catch of edible fish of these vessels, for small quantities estimated at not more than 5 per cent of their total catch, were landed at ports in New England, other than these three, at New York City, and at ports in New Jersey.

The fishing vessels landing fares at these three ports did not always operate the same type of gear throughout the entire year. At one season a certain vessel may be outfitted as a line trawler; at another season as a purse seiner; and at still another season for swordfish fishing with harpoons. Thus, vessels may be fished with two or more types of gear during the course of a year. In such a case the vessel is classed with others operating similar gear, while it is fishing that type of gear.

From the total it will be noted that the grand total of the number of vessels operated, is exclusive of duplication, and that the total number of vessels operating each type of gear also is shown.

Line trawls.—A line-trawl fishery was prosecuted by 115 vessels in 1930. These vessels made 1,903 trips to 24 main fishing grounds, and were absent from port 11,999 days, or an average of 6.3 days per trip. Their catches aggregated 74,973,078 pounds, or 21 per cent of the total landings by vessels at the three ports. Of this amount, haddock constituted 50 per cent; cod, 32 per cent; and hake, 9 per cent. Other species of importance in the catch by line trawls were cusk, halibut, and pollock. Of the total catch, 32 per cent were taken on Browns Bank, and 32 per cent on South Channel. Other banks on which considerable quantities of fish were taken by line trawls were Georges Bank, La Have Bank, Jeffreys Ledge, Gulf of St. Lawrence, and on miscellaneous banks along the shore.

Hand lines.—A hand-line fishery was prosecuted by 27 vessels in 1930. These vessels made 153 trips to 6 main fishing grounds, and were absent from port, 1,334 days, or an average of 8.7 days per trip. Their catches aggregated 4,968,226 pounds, or slightly over 1 per cent of the total landings at the three ports. Of this amount, cod constituted 83 per cent; haddock, 6 per cent; and pollock, 4 per cent. Only minor amounts of other species were taken by hand lines. Of the total catch, 44 per cent were taken on Georges Bank and 31 per cent on Cape Shore. Other grounds on which considerable quantities of fish were taken by hand lines are Nantucket Shoals and Browns Bank.

Harpoons.—A fishery with harpoons was prosecuted by 91 vessels in 1930. These vessels made 330 trips to 7 main fishing grounds and were absent from port 5,399 days, or an average of 16.4 days per trip. The catch amounted to 3,300,084 pounds of swordfish and 1,750 pounds of other fish, making a total of about 1 per cent of the entire landings by vessels at the three ports in 1930. Of the total catch, 72 per cent was taken on Georges Bank.

Otter trawls, large vessels.—A fishery with otter trawls was prosecuted by 64 vessels of 91 net tons and over in 1930. These vessels made 1,038 trips to 8 main fishing grounds, and were absent from port 10,672 days, or an average of 10.3 days per trip (8.7 days in 1929). This is the same number of vessels that operated in 1929, although they made fewer trips and were absent fewer days than in 1929. Their catch amounted to 87,279,581 pounds, or 25 per cent of the total landings by vessels at the three ports. Of the total 66 per cent consisted of haddock, 19 per cent of cod, 6 per cent of hake, 5 per cent of flounders, and 3 per cent of pollock. The remainder of the catch consisted mainly of halibut. Of the total catch, 74 per cent was taken from Georges Bank and 18 per cent from South Channel. Only minor catches were made on the other grounds where large otter trawlers fished.

Cod, haddock, and hake landed at Boston and Gloucester, Mass., and Portland, Me., by large otter trawlers and large V–D otter trawlers in various years, 1908 to 1930

Year	Vessels fishing	Trips	Cod	Haddock	Hake	Year	Vessels fishing	Trips	Cod	Haddock	Hake
			Pounds	*Pounds*	*Pounds*				*Pounds*	*Pounds*	*Pounds*
1908	(1)	44	209, 800	1, 542, 000	46, 600	1922	(1)	578	11,161,947	35, 878, 524	576, 370
1909	(1)	47	159, 800	1, 719, 000	74, 400	1923	33	665	14,961,590	35, 527, 297	471, 600
1910	(1)	59	125, 850	2, 775, 000	46, 600	1924	32	543	8, 231. 430	35, 197, 940	616, 853
1911	(1)	178	564, 500	7, 367, 100	151, 700	1925	29	607	7, 309, 930	44, 034, 281	711, 212
1912	7	295	1, 952, 950	12, 966, 700	105, 500	1926	30	667	5, 203, 911	52, 405, 653	894, 885
1913	10	326	1, 667, 806	12, 488, 992	209, 485	1927	26	794	3, 982, 905	69, 237, 652	994, 730
1914	11	387	1, 149, 595	15, 383, 550	259, 913	1928	42	1, 040	6, 425, 573	79, 165, 206	1,464,785
1920	[2] 44	646	6, 311, 389	51, 962, 457	----------	1929	61	1, 545	10,983,445	97, 975, 496	2,906,677
1921	[2] 26	346	2, 482, 833	26, 734, 893	241, 650	1930	72	1, 828	26,897,752	99, 796, 766	6,462,915

[1] Data not available.

[2] Includes 3 Canadian vessels.

Otter trawls, medium vessels.—A fishery with otter trawls was also prosecuted by 73 vessels of 21 to 90 net tons, inclusive, in 1930. Medium otter trawls are referred to by some in the fisheries as "draggers." These vessels made 727 trips to 9 main fishing grounds and were absent from port 4,652 days, or an average of 6.4 days per trip. Their catches aggregated 20,320,439 pounds, or about 6 per cent of the total landings by vessels at the three ports. Of this, haddock constituted 64 per cent; flounders, 19 per cent; and cod, 14 per cent. Only small quantities of other fish were brought in by this type of vessel. Of the total catch, 45 per cent were taken on Georges Bank, and 39 per cent on South Channel. Only small quantities were taken on the other banks where these vessels fished.

Otter trawls, small vessels.—A fishery with otter trawls was also prosecuted by 69 vessels of 5 to 20 net tons, inclusive, in 1930. Small otter trawlers are referred to by some in the fisheries as "flounder draggers." These vessels made 547 trips to 7 main fishing grounds, and were absent from port 2,014 days, or an average of 3.7 days per trip. Their catches aggregated 4,834,017 pounds, or a little over 1 per cent of the total landings by vessels at the three ports. Of this amount, 49 per cent consisted of flounders and 33 per cent of haddock. Considerable quantities of cod and hake were also brought in by these vessels. Of the total catch, 57 per cent were taken on banks along the shore, and 22 per cent on South Channel. Catches by this type of vessels on the other banks where they fished were very small.

V–D trawls (*otter trawls*), *large vessels.*—A fishery with V–D otter trawls was prosecuted by 51 vessels of 91 net tons and over in 1930. The large number of vessels operating V–D trawls in 1930 is due to the fact that many of the regular otter-trawl vessels also carry a V–D type of trawl and for this reason there is some duplication within the large otter-trawl group and the large V–D trawl group. These vessels made 790 trips to 10 main fishing grounds, and were absent from port 7,206 days, or an average of 9.1 days per trip. Their catches aggregated 58,693,591 pounds, or 17 per cent of the total landings by vessels at the three ports. Of this amount 72 per cent consisted of haddock, 18 per cent of cod, 4 per cent of flounders, 2 per cent of hake, and 2 per cent of pollock. Of the total catch, 57 per cent was taken on Georges Bank and 24 per cent on South Channel.

V–D trawls (*otter trawls*), *medium vessels.*—A fishery with V–D otter trawls was prosecuted by 64 vessels of 21 to 90 net tons, inclusive, in 1930. These vessels made 1,101 trips to 10 main fishing grounds, and were absent from port 8,697 days, or an average of 7.9 days per trip. Their catches amounted to 43,902,614 pounds, or about 12 per cent of the total landings by vessels at the three ports. Of this amount, 80 per cent consisted of haddock, 12 per cent of cod, and 4 per cent of flounders. The remainder was made up chiefly of hake and pollock. Of the total catch 56 per cent were taken on Georges Bank and 36 per cent on South Channel. Only minor quantities were taken on the other banks where these vessels fished.

V–D trawls (*otter trawls*), *small vessels.*—A fishery with V–D otter trawls was prosecuted by 2 vessels of 5 to 20 net tons, inclusive, in 1930. These vessels made 11 trips to 3 main fishing grounds and were absent from port 89 days, or an average of 8.1 days per trip. Their catch, aggregating 274,899 pounds and consisting almost entirely of haddock, was taken principally on Georges Bank and South Channel.

Sink gill nets.—A fishery with sink gill nets was prosecuted by 39 vessels in 1930. These made 3,614 trips to Jeffreys Ledge and banks along the shore and were absent from port 3,635 days, or an average of about 1 day per trip. The catch amounted to 16,793,933 pounds, or about 5 per cent of the total landings by vessels at the three ports. Of this amount, 53 per cent consisted of pollock, 28 per cent of cod, 10 per cent of haddock, and 8 per cent of hake. Practically the entire amount was taken on those banks along the shore.

Drift gill nets.—A fishery with drift gill nets was prosecuted by 90 vessels in 1930. They made 732 trips to Bay of Islands and banks along the shore and were absent from port 1,520 days, or an average of 2.1 days per trip. Their catch amounted to 3,523,617 pounds, or about 1 per cent of the total landings by vessels at the three ports. Of this amount about two-thirds consisted of herring, which were taken on Bay of Islands, and one-third of mackerel taken mainly on grounds near the shore.

Purse seines.—A fishery with purse seines (mackerel fishery) was prosecuted by 113 vessels in 1930. This is the same number that operated in 1929. They made 1,543 trips to 10 main fishing grounds and were absent from port 4,220 days, or an average of 2.7 days per trip. Their landings at the three New England ports amounted to 34,667,329 pounds or 10 per cent of the total landings at the three ports. Of this amount, 93 per cent consisted of mackerel, and 3 per cent of herring. Of the total, 46 per cent was taken on grounds near the shore and 40 per cent on South Channel. Considerable quantities were also taken off Chatham and on Nantucket Shoals.

Scallop drags or trawls.—A fishery with scallop drags or trawls was prosecuted by 4 vessels in 1930. These made 5 trips to Boston and were absent from port 24 days, or an average of 4.8 days per trip. The catch consisted of 21,807 pounds of scallop meats. These were obtained from scallops taken on Nantucket Shoals, Georges Bank, and South Channel.

Summary.—In general, the otter trawls and V–D trawls were the most important gear used by vessels landing fish at the three New England ports, catching 61 per cent of the total landings. Line trawls were next in importance, catching 21 per cent of the total.

Purse seines were third, with 10 per cent of the total. Sink gill nets accounted for 5 per cent and hand lines, harpoons, drift gill nets, and scallop drags the remaining 3 per cent.

Among the fishing grounds Georges Bank was of most importance, furnishing 42 per cent of the fish caught by the vessels. South Channel, which is near Georges Bank, was second, and furnished 26 per cent. About the same per cent of the total landings was caught on these banks during the year 1929. Shore grounds furnished 12 per cent, Browns Bank, 9 per cent; La Have Bank, 3 per cent; and Nantucket Shoals, 2 per cent. All of these grounds, except La Have Bank, are off the United States. The catch on any one of the other banks or grounds, where fishing was prosecuted by vessels, furnished less than 4,000,000 pounds each.

The fishery products landed at the three ports by vessels are taken chiefly on fishing grounds off the United States west of 66° west longitude. In 1930 these grounds furnished 93 per cent of the total landings by vessels at the three ports. Those fishing grounds off the Canadian Provinces east of 66° west longitude furnished 6 per cent; while those off Newfoundland, also east of 66° west longitude, furnished about 1 per cent.

The large catch on grounds off the United States is influenced by the large catches by otter trawls on Georges Bank, South Channel, Browns Bank, and Nantucket Shoals, which fishing grounds are suited to this type of gear, and which are comparatively near packing centers. Compared with 1929, there was a decrease of 5 per cent in the landings of fish taken on grounds off the United States, an increase of 118 per cent of the landings of the fish taken off Canadian Provinces, and an increase of 53 per cent in the landings of fish taken off Newfoundland.

Landings by fishing vessels at the three principal New England ports, 1930

BY GEAR AND FISHING GROUNDS

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Line trawls:										
Grand Bank	7	15	426	198, 871	16, 387				18, 847	
Green Bank	2	2	59	2, 470					2, 185	
St. Peters Bank	1	3	48							
Seal Island Grounds	3	3	19	5, 760	5, 000	160	27, 435	1, 480		28, 575
Labrador coast	1	1	46							
Gulf of St. Lawrence	4	5	138	983, 307	901, 613	398, 879				
Scatari Bank	1	1	25	22, 942	3, 259					
Quereau Bank	1	1	23	14, 136	388					
Sable Island Bank (Western Bank)	5	7	113	274, 635	250, 465	900	141, 865		6, 825	
Cape Shore	17	22	228	133, 890	220, 630	1, 140	476, 665	1, 250	94, 480	
Emerald Bank	1	1	15	16, 100	25, 500		33, 700		4, 500	
La Have Bank	31	57	694	661, 703	798, 202	500	1, 907, 255	2, 020	149, 000	
Roseway Bank	5	5	49	28, 400	54, 200	1, 200	215, 640		12, 800	
Browns Bank	49	325	3, 036	3, 330, 309	2, 420, 065	4, 015	15, 618, 624	39, 535	469, 035	14, 770
Georges Bank	47	160	1, 812	4, 348, 391	758, 197	530	3, 482, 084	25, 115	119, 055	
South Channel	45	475	3, 080	3, 165, 382	3, 591, 510	8, 180	11, 708, 085	20, 250	3, 867, 575	1, 920
Off Chatham	3	5	23	27, 970	15, 730		139, 400	800	33, 700	
Nantucket Shoals	7	7	51	37, 410	33, 800		3, 060	400	800	
Cashes Bank	29	63	264	196, 913	79, 215	3, 485	456, 580	4, 985	340, 340	71, 400
Fippenies Bank	6	9	21	15, 765	4, 873	445	23, 675	3, 005	5, 840	12, 205
Platts Bank	7	13	29	12, 720	3, 955	255	30, 370	545		18, 550
Jeffreys Ledge	23	351	760	233, 825	88, 168	14, 587	1, 264, 344	42, 448	291, 561	465, 151
Middle Bank (Stellwagen Bank)	11	42	185	40, 996	17, 810	1, 300	413, 540	7, 335	160, 305	
Shore, general	48	330	855	299, 947	115, 340	32, 650	1, 138, 522	34, 073	53, 815	247, 610
Total	[1] 115	1, 903	11, 999	14, 051, 842	9, 404, 307	468, 226	37, 080, 844	183, 241	5, 630, 663	860, 181
Hand lines:										
Sable Island Bank (Western Bank)	1	1	18	60, 800	56, 710		28, 950			
Cape Shore	9	37	301	523, 578	687, 250	2, 900	129, 580	900	20, 125	
Browns Bank	6	11	110	148, 555	166, 470		26, 150		1, 500	
Georges Bank	14	61	586	1, 248, 935	575, 450	1, 900	100, 180	1, 500	24, 665	
Nantucket Shoals	9	41	310	201, 960	414, 624	75	26, 740		230	
Shore, general	2	2	9	24, 220	7, 075		1, 775			
Total	[1] 27	153	1, 334	2, 208, 048	1, 907, 579	4, 875	313, 375	2, 400	46, 520	

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[1] Exclusive of duplication.

Landings by fishing vessels at the three principal New England ports, 1930—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Harpoons:										
Seal Island Grounds	1	1	20							
Cape Shore	7	7	144							
Browns Bank	47	64	1,194							
Georges Bank	88	239	3,765							
South Channel	1	1	15							
Nantucket Shoals	14	17	255							
Shore, general	1	1	6							
Total	[1] 91	330	5,399							
Otter trawls, large:										
Sable Island Bank (Western Bank)	12	13	149	198,650	180,250		893,605	69,790	5,140	
Emerald Bank	2	2	23	14,630	44,100		127,850	13,800	1,700	
La Have Bank	17	25	277	148,775	200,650	690	1,264,865	113,500	68,380	
Browns Bank	16	26	267	156,070	160,910	2,500	1,514,790	88,335	27,070	
Georges Bank	61	763	7,779	5,259,929	7,022,806	17,800	40,348,998	2,639,572	3,319,985	16,410
South Channel	47	198	2,066	1,110,835	1,722,750	7,600	8,800,935	725,575	1,614,265	32,450
Off Chatham	1	1	8	3,300	1,100		24,900	10,900	7,000	
Nantucket Shoals	9	10	103	28,500	69,680	16,550	577,280	19,620	15,235	
Total	[1] 64	1,038	10,672	6,920,689	9,402,246	45,140	53,553,223	3,681,092	5,058,775	48,860
Otter trawls, medium:										
La Have Bank	3	3	29	3,514	21,700		105,500	5,200	6,725	
Browns Bank	5	5	39	15,550	7,095		132,125	9,650	250	
Georges Bank	38	257	2,026	398,381	499,100	9,835	6,090,240	294,415	45,365	
South Channel	38	200	1,535	99,685	1,241,525	1,375	4,942,340	240,838	183,395	7,600
Off Chatham	2	2	11	11,000	900		17,425	800	575	
Nantucket Shoals	20	30	225	17,055	252,895	2,800	658,680	24,205	16,320	
Jeffreys Ledge	1	1	4	140			1,200			
Middle Bank (Stellwagen Bank)	1	1	3	200	40	40	4,345	280	300	
Shore, general	41	228	780	81,604	95,790	1,600	567,547	14,775	68,444	1,130
Total	[1] 73	727	4,652	627,129	2,119,045	15,650	12,519,402	590,163	321,374	8,730
Otter trawls, small:										
Georges Bank	8	28	225	16,030	30,160	9,150	318,100	8,305	2,550	
South Channel	9	41	268	17,280	228,675	1,800	577,570	35,275	33,845	
Off Chatham	1	1	8		150		750	340	400	

Nantucket Shoals	8	21	122	3, 880	57, 068		190, 150	8, 300	4, 745	
Cashes Bank	1	1	5	600			2, 500		3, 500	
Jeffreys Ledge	4	5	16	3, 735	740		16, 150	550	4, 600	80
Shore, general	63	450	1, 370	149, 972	115, 711	5, 280	434, 061	22, 267	67, 044	24, 926
Total	[1] 69	547	2, 014	191, 497	432, 504	16, 230	1, 539, 281	75, 037	116, 684	25. 006
V-D trawls, large:										
Bay of Fundy	1	1	11	6, 000	34, 000		94, 700	15, 750		
Sable Island Bank (Western Bank)	10	14	152	159, 210	209, 225		805, 520	70, 850	20, 850	
Emerald Bank	3	3	34	25, 150	19, 200		216, 000	32, 050	8, 300	
La Have Bank	15	44	412	185, 300	341, 045	950	2, 241, 855	151, 625	52, 210	
Browns Bank	14	23	207	126, 485	121, 300		1, 660, 144	89, 690	8, 315	
Georges Bank	49	452	4, 172	2, 992. 442	3, 333, 460	16, 155	22, 696, 994	1, 420, 446	646, 190	15, 800
South Channel	40	205	1, 777	740, 255	1. 806, 720	2, 305	9, 527, 570	624, 742	517, 385	13, 500
Off Chatham	1	1	8	1, 060	2, 700		11, 000	1, 000	1, 600	
Nantucket Shoals	24	46	424	82, 840	316, 125	1, 950	2, 781, 450	46, 465	69, 130	1, 000
Shore, general	1	1	9	1, 300	4, 400		71, 900	2, 700	1, 000	
Total	[1] 51	790	7, 206	4, 320, 042	6, 188, 175	21, 360	40, 107, 133	2, 455, 318	1, 324, 980	30, 300
V-D trawls, medium:										
Cape Shore	1	1	11	12, 800	11, 450		44, 100		1, 550	
La Have Bank	25	36	309	34, 560	82, 950	3, 800	807, 385	52, 900	21, 755	
Browns Bank	14	19	152	82, 570	74, 390		800, 035	38, 750	7, 060	
Georges Bank	55	578	4, 620	2, 085, 736	850, 959	8, 080	19, 188, 755	937, 830	295, 635	8, 700
Clark Bank	1	1	7	850	590	3, 000	32, 200		1, 450	
South Channel	55	423	3, 297	546, 623	1, 423, 390	4, 535	11, 610, 795	667, 734	472, 755	15, 720
Off Chatham	5	12	82	14, 690	8, 425		179, 405	12, 830	15, 760	
Nantucket Shoals	10	18	125	5, 550	99, 325		551, 605	1, 625	6, 400	
Jeffreys Ledge	1	1	5	670	370			420		
Shore, general	10	12	89	20, 780	23, 370		370, 312	10, 350	4, 070	
Total	[1] 64	1, 101	8, 697	2, 804, 829	2, 575, 219	19, 415	33, 584, 592	1, 722, 439	826, 435	24, 420
V-D trawls, small:										
La Have Bank	1	2	22	835	4, 500		31, 000	1, 700	1, 730	
Georges Bank	2	5	42	3, 110	6, 305		88, 458	3, 280	1, 610	
South Channel	1	4	25	1, 700	15, 570		72, 700	6, 845	665	
Total	2	11	89	5, 645	26, 375		192, 158	11, 825	4, 005	
Sink gill nets:										
Jeffreys Ledge	8	98	98	181, 605	9, 523		5, 798		13, 590	42, 541
Shore, general	39	3, 516	3, 537	4, 441, 104	85, 579	500	1, 679, 516	700	1, 059, 071	177, 570
Total	[1] 39	3, 614	3, 635	4, 622, 709	95, 102	500	1, 685, 314	700	1, 072, 661	220, 111

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[1] Exclusive of duplication.

Landings by fishing vessels at the three principal New England ports, 1930—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Drift gill nets:										
Bay of Islands	4	4	178							
Shore, general	86	728	1,342							
Total	[1] 90	732	1,520							
Purse seines:										
Cape Shore	4	4	29							
Georges Bank	8	11	36							
South Channel	79	409	1,291	11,500	20,500		70,100		1,070	
Off Chatham	60	136	455							
Nantucket Shoals	44	58	121							
Cashes Bank	1	2	4							
Jeffreys Ledge	11	20	41							
Middle Bank (Stellwagen Bank)	37	49	127							
South	13	13	52							
Shore, general	107	841	2,064	5,075	185		3,696		560	225
Total	[1] 113	1,543	4,220	16,575	20,685		73,796		1,630	225
Scallop drags:										
Georges Bank	1	1	6							
South Channel	1	1	4							
Nantucket Shoals	2	3	14							
Total	[1] 4	5	24							
Grand total	[1] 441	12,494	61,461	35,769,005	32,171,237	591,396	180,649,118	8,722,215	14,403,727	1,217,833

[1] Exclusive of duplication.

NOTE.—The three principal New England ports are Boston and Gloucester, Mass., and Portland, Me. Otter trawls and V-D trawls are classified according to the size of the vessel. The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation.

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
Line trawls:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Grand Bank	180	13, 941	471, 689		3, 454				723, 369
Green Bank		1, 600	64, 146						70, 401
St. Peters Bank			140, 372						140, 372
Seal Island Grounds	2, 385	8, 560	105					2, 000	81, 460
Labrador coast			60, 000						60, 000
Gulf of St. Lawrence			16, 942						2, 300, 741
Scatari Bank		1, 750	47, 146						75, 097
Quereau Bank			12, 166						26, 690
Sable Island Bank (Western Bank)	1, 300	6, 160	24, 566					1, 910	708, 626
Cape Shore	20, 620	116, 125	2, 723		213			9, 330	1, 077, 066
Emerald Bank	1, 200	6, 000	435					600	88, 035
La Have Bank	57, 418	218, 069	78, 801	890	2, 575			59, 155	3, 935, 588
Roseway Bank	780	29, 045	210					850	343, 125
Browns Bank	257, 140	1, 334, 555	219, 559	3, 305	4, 669			164, 565	23, 880, 146
Georges Bank	86, 895	247, 290	708, 023	8, 720	32, 883			13, 737	9, 830, 920
South Channel	281, 415	923, 615	42, 140	1, 415	234			48, 278	23, 659, 999
Off Chatham	2, 215	545	1, 119					2, 025	223, 504
Nantucket Shoals	765		6, 408					580	83, 223
Cashes Bank	11, 140	384, 765	2, 879					16, 259	1, 567, 961
Fippenies Bank	1, 539	14, 110	274					4, 115	85, 846
Platts Bank	1, 282	15, 400						5, 759	88, 836
Jeffreys Ledge	60, 009	299, 235	2, 468	2, 555				105, 129	2, 869, 480
Middle Bank (Stellwagen Bank)	17, 185	68, 475	1, 230			495		6, 260	734, 931
Shore, general	22, 906	265, 937	3, 151	7, 695				96, 016	2, 317, 662
Total	826, 374	3, 955, 177	1, 906, 552	24, 580	44, 028	495		536, 568	74, 973, 078
Hand lines:									
Sable Island Bank (Western Bank)	800								147, 260
Cape Shore	113, 655	53, 135	3, 702		708			15, 120	1, 550, 653
Browns Bank	19, 610	18, 560	13, 926		1, 476			3, 565	399, 812
Georges Bank	86, 689	40, 255	66, 082		4, 717			19, 370	2, 169, 743
Nantucket Shoals	3, 575		14, 443	4, 000	432			660	666, 739
Shore, general	500		349					100	34, 019
Total	224, 829	111, 950	98, 502	4, 000	7, 333			38, 815	4, 968, 226
Harpoons:									
Seal Island Grounds					14, 000				14, 000
Cape Shore					48, 682				48, 682
Browns Bank					668, 575			186	668, 761
Georges Bank					2, 367, 106			1, 479	2, 368, 585
South Channel					15, 435				15, 435
Nantucket Shoals					185, 145				185, 145
Shore, general					1, 141			85	1, 226
Total					3, 300, 084			1, 750	3, 301, 834

Landings by fishing vessels at the three principal New England ports, 1930—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Otter trawls, large:									
Sable Island Bank (Western Bank)	97, 380	1, 055	2, 628	24, 415				23, 135	1, 496, 048
Emerald Bank	15, 425		1, 301	1, 700				3, 625	224, 131
La Have Bank	53, 120	8, 225	12, 003	53, 630				42, 115	1, 965, 953
Browns Bank	49, 620	3, 755	12, 095	55, 040		215		64, 895	2, 135, 295
Georges Bank	1, 541, 920	188, 513	256, 778	3, 188, 579		1, 510		846, 745	64, 649, 545
South Channel	607, 820	47, 565	59, 219	992, 880	1, 730			247, 347	15, 970, 971
Off Chatham	6, 375	135	123	4, 275				540	58, 648
Nantucket Shoals	8, 255		1, 655	28, 105				14, 110	778, 990
Total	2, 379, 915	249, 248	345, 802	4, 348, 624	1, 730	1, 725		1, 242, 512	87, 279, 581
Otter trawls, medium:									
La Have Bank	3, 100		223	1, 660				2, 510	150, 132
Browns Bank	1, 205		608	12, 170				4, 450	183, 103
Georges Bank	31, 645	1, 780	22, 686	1, 684, 582				51, 524	9, 129, 553
South Channel	25, 977		4, 674	1, 122, 840		150		41, 591	7, 911, 990
Off Chatham	1, 750			14, 135				200	46, 785
Nantucket Shoals	5, 635		601	171, 623		22		3, 300	1, 153, 136
Jeffreys Ledge				880				80	2, 300
Middle Bank (Stellwagen Bank)	60	75							5, 340
Shore, general	85, 273	900	1, 132	791, 033	8, 477			20, 395	1, 738, 100
Total	154, 645	2, 755	29, 924	3, 798, 923	8, 477	172		124, 050	20, 320, 439
Otter trawls, small:									
Georges Bank	380	115	1, 934	221, 345	663			225	608, 957
South Channel	1, 660	1, 270	844	139, 580	2, 368			9, 930	1, 050, 097
Off Chatham	50			940					2, 630
Nantucket Shoals	150		301	103, 205	999			570	369, 368
Cashes Bank	110								6, 710
Jeffreys Ledge	230	5, 706	57	7, 175				140	39, 163
Shore, general	6, 988	1, 055	959	1, 889, 659				39, 170	2, 757, 092
Total	9, 568	8, 146	4, 095	2, 361, 904	4, 030			50, 035	4, 834, 017
V-D trawls, large:									
Bay of Fundy	1, 000		176					1, 165	152, 791
Sable Island Bank (Western Bank)	55, 175		3, 920	38, 220				18, 975	1, 381, 945
Emerald Bank	9, 600	200	1, 152	3, 970				8, 750	324, 372
La Have Bank	109, 280	5, 875	10, 540	51, 010		300		30, 396	3, 180, 386
Browns Bank	34, 225	2, 035	10, 105	65, 250				53, 250	2, 170, 799
Georges Bank	689, 832	54, 937	81, 781	1, 234, 343	245	9, 445		263, 116	33, 455, 186
South Channel	235, 170	12, 500	39, 385	657, 989		1, 350		231, 675	14, 410, 546
Off Chatham	5, 000	140		730				450	23, 680
Nantucket Shoals	18, 123	500	3, 380	168, 535				21, 407	3, 510, 905
Shore, general			281	1, 400					82, 981
Total	1, 157, 405	76, 187	150, 720	2, 221, 447	245	11, 095		629, 184	58, 693, 591

V-D trawls, medium:									
Cape Shore	500	10, 150							80, 550
La Have Bank	21, 710	345	1, 494	19, 465		35		7, 025	1, 053, 424
Browns Bank	17, 990	2, 000	1, 211	31, 075				7, 385	1, 062, 466
Georges Bank	132, 715	6, 700	31, 128	847, 030	631	1, 965		142, 329	24, 538, 193
Clark Bank	450			1, 000				250	39, 790
South Channel	133, 860	16, 880	15, 659	661, 769	3, 115	11, 963		142, 185	15, 726, 983
Off Chatham	2, 475			5, 545				7, 330	246, 460
Nantucket Shoals	1, 400		187	19, 520	249	1, 740		1, 250	688, 851
Jeffreys Ledge				2, 800					4, 260
Shore, general	615	40	845	19, 695				11, 560	461, 637
Total	311, 715	36, 115	50, 524	1, 607, 899	3, 995	15, 703		319, 314	43, 902, 614
V-D trawls, small:									
La Have Bank	125	145	35	870				370	41, 310
Georges Bank	370		49	30, 385					133, 567
South Channel	150		107	1, 645				640	100, 022
Total	645	145	191	32, 900				1, 010	274, 899
Sink gill nets:									
Jeffreys Ledge	159, 935	401						29, 417	442, 810
Shore, general	8, 756, 044	8, 938	214	1, 845		10, 150		129, 892	16, 351, 123
Total	8, 915, 979	9, 339	214	1, 845		10, 150		159, 309	16, 793, 933
Drift gill nets:									
Bay of Islands							2, 345, 364		2, 345, 364
Shore, general				400		1, 167, 842		10, 011	1, 178, 253
Total				400		1, 167, 842	2, 345, 364	10, 011	3, 523, 617
Purse seines:									
Cape Shore						144, 880			144, 880
Georges Bank						321, 375			321, 375
South Channel	595	600	334	4, 000	10, 438	13, 866, 288		6, 310	13, 991, 735
Off Chatham				215		2, 156, 765		41, 175	2, 198, 155
Nantucket Shoals						1, 022, 585		400	1, 022, 985
Cashes Bank							39, 000		39, 000
Jeffreys Ledge						113, 129	196, 170	922	310, 221
Middle Bank (Stellwagen Bank)						539, 086			539, 086
South						304, 130		1, 025	305, 155
Shore, general	1, 429				674	13, 864, 812	923, 980	994, 101	15, 794, 737
Total	2, 024	600	334	4, 215	11, 112	32, 333, 050	1, 159, 150	1, 043, 933	34, 667, 329
Scallop drags:									
Georges Bank								5, 400	5, 400
South Channel								6, 300	6, 300
Nantucket Shoals								10, 107	10, 107
Total								21, 807	21, 807
Grand total	13, 983, 099	4, 449, 662	2, 586, 858	14, 406, 737	3, 381, 034	33, 540, 232	3, 504, 514	4, 178, 298	353, 554, 965

Landings by fishing vessels at the three principal New England ports, 1930—Continued

SUMMARY: BY FISHING GROUNDS

Fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
East of 66° W. longitude										
Off Newfoundland:	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Grand Bank	7	15	426	198,871	16,387	-----	-----	-----	18,847	-----
Green Bank	2	2	59	2,470	-----	-----	-----	-----	2,185	-----
St. Peters Bank	1	3	48	-----	-----	-----	-----	-----	-----	-----
Bay of Islands	4	4	178	-----	-----	-----	-----	-----	-----	-----
Total	[1] 11	24	711	201,341	16,387	-----	-----	-----	21,032	-----
Off Canada:										
Bay of Fundy	1	1	11	6,000	34,000	-----	94,700	15,750	-----	-----
Seal Island Grounds	4	4	39	5,760	5,000	160	27,435	1,480	-----	28,575
Labrador Coast	1	1	46	-----	-----	-----	-----	-----	-----	-----
Gulf of St. Lawrence	4	5	138	983,307	901,613	398,879	-----	-----	-----	-----
Scatari Bank	1	1	25	22,942	3,259	-----	-----	-----	-----	-----
Quereau Bank	1	1	23	14,136	388	-----	-----	-----	-----	-----
Sable Island Bank (Western Bank)	25	35	432	693,295	696,650	900	1,869,940	140,640	32,815	-----
Cape Shore	33	71	713	670,268	919,330	4,040	650,345	2,150	116,155	-----
Emerald Bank	6	6	72	55,880	88,800	-----	377,550	45,850	14,500	-----
La Have Bank	86	167	1,743	1,034,687	1,449,047	5,940	6,357,860	326,945	299,800	-----
Roseway Bank	5	5	49	28,400	54,200	1,200	215,640	-----	12,800	-----
Total	[1] 123	297	3,291	3,514,675	4,152,287	411,119	9,593,470	532,815	476,070	28,575
West of 66° W. longitude										
Off United States:										
Browns Bank	137	473	5,005	3,859,539	2,950,230	6,515	19,751,868	265,960	513,230	14,770
Georges Bank	266	2,555	25,069	16,352,954	13,076,437	63,450	92,313,809	5,330,463	4,455,055	40,910
Clark Bank	1	1	7	850	590	3,000	32,200	-----	1,450	-----
South Channel	264	1,957	13,358	5,693,260	10,050,610	25,795	47,310,095	2,321,259	6,690,955	71,190
Off Chatham	73	158	595	58,020	29,005	-----	372,880	26,670	59,035	-----
Nantucket Shoals	133	251	1,750	377,195	1,243,517	21,375	4,788,965	100,615	112,860	1,000
Cashes Bank	30	66	273	197,513	79,215	3,485	459,080	4,985	343,840	71,400
Fippenies Bank	6	9	21	15,765	4,873	445	23,675	3,005	5,840	12,205
Platts Bank	7	13	29	12,720	3,955	255	30,370	545	-----	18,550
Jeffreys Ledge	42	476	924	419,975	98,801	14,587	1,287,492	43,418	309,751	507,772
Middle Bank (Stellwagen Bank)	49	92	315	41,196	17,850	1,340	417,885	7,615	160,605	-----
South	13	13	52	-----	-----	-----	-----	-----	-----	-----
Shore, general	252	6,109	10,061	5,024,002	447,450	40,030	4,267,329	81,865	1,254,004	451,461
Total	[1] 431	12,173	57,459	32,052,989	28,002,563	180,277	171,055,648	8,189,400	13,906,625	1,189,258
Grand total	[1] 441	12,494	61,461	35,769,005	32,171,237	591,396	180,649,118	8,722,215	14,403,727	1,217,833

Fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
East of 66° W. longitude	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Off Newfoundland:									
Grand Bank	180	13,941	471,689		3,454				723,369
Green Bank		1,600	64,146						70,401
St. Peters Bank			140,372						140,372
Bay of Islands							2,345,364		2,345,364
Total	180	15,541	676,207		3,454		2,345,364		3,279,506
Off Canada:									
Bay of Fundy	1,000		176					1,165	152,791
Seal Island Grounds	2,385	8,560	105		14,000			2,000	95,460
Labrador coast			60,000						60,000
Gulf of St. Lawrence			16,942						2,300,741
Scatari Bank		1,750	47,146						75,097
Quereau Bank			12,166						26,690
Sable Island Bank (Western Bank)	154,655	7,215	31,114	62,635				44,020	3,733,879
Cape Shore	134,775	179,410	6,425		49,603	144,880		24,450	2,901,831
Emerald Bank	26,225	6,200	2,888	5,670				12,975	636,538
La Have Bank	244,753	232,659	103,096	127,525	2,575	335		141,571	10,326,793
Roseway Bank	780	29,045	210					850	343,125
Total	564,573	464,839	280,268	195,830	66,178	145,215		227,031	20,652,945
West of 66° W. longitude									
Off United States:									
Browns Bank	379,790	1,360,905	257,504	166,840	674,720	215		298,296	30,500,382
Georges Bank	2,570,446	539,590	1,168,461	7,214,984	2,406,245	334,295		1,343,925	147,211,024
Clark Bank	450			1,000				250	39,790
South Channel	1,286,647	1,002,430	162,362	3,582,118	33,320	13,879,751		734,256	92,844,078
Off Chatham	17,865	820	1,242	25,840		2,156,765		51,720	2,799,862
Nantucket Shoals	37,903	500	26,975	494,988	186,825	1,024,347		52,384	8,469,449
Cashes Bank	11,250	384,765	2,879				39,000	16,259	1,613,671
Fippenies Bank	1,539	14,110	274					4,115	85,846
Platts Bank	1,282	15,400						5,759	88,836
Jeffreys Ledge	220,174	305,342	2,525	13,410		113,129	196,170	135,688	3,668,234
Middle Bank (Stellwagen Bank)	17,245	68,550	1,230			539,581		6,260	1,279,357
South						304,130		1,025	305,155
Shore, general	8,873,755	276,870	6,931	2,711,727	10,292	15,042,804	923,980	1,301,330	40,716,830
Total	13,418,346	3,969,282	1,630,383	14,210,907	3,311,402	33,395,017	1,159,150	3,951,267	329,622,514
Grand total	13,983,099	4,449,662	2,586,858	14,406,737	3,381,034	33,540,232	3,504,514	4,178,298	353,554,965

[1] Exclusive of duplication.

NOTE.—The weight of salt fish landed has been converted to the equivalent of fresh fish as landed.

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Me., 1930

Fishing grounds	January	February	March	April	May	June	July
Newfoundland:							
Grand Bank		28	11	89	100	58	42
St. Peters Bank		8	21	19			
Bay of Islands	178						
Total	178	36	32	108	100	58	42
Off Canada:							
Bay of Fundy					11		
Labrador coast							46
Gulf of St. Lawrence					26		
Scatari Bank					25		
Quereau Bank					23		
Sable Island Bank (Western Bank)	24			10	178	18	71
Cape Shore					35	25	129
Emerald Bank			23	22			
La Have Bank	388	31	60	65	72	119	101
Roseway Bank					13		
Total	412	31	83	97	383	162	347
Off United States:							
Browns Bank	328	530	635	823	325	45	233
Georges Bank	1,720	2,693	3,105	2,290	1,981	2,480	2,949
Clark Bank	7						
South Channel	853	252	172	340	423	1,357	2,880
Off Chatham	12	11	8	21		13	10
Nantucket Shoals	85	11	8	144	348	97	155
Cashes Bank	91	30	6	18	9	3	
Fippenies Bank	3	2	4	2			
Platts Bank	15	10					
Jeffreys Ledge	96	96	78	18	2	36	13
Middle Bank (Stellwagen Bank)	51	28	20	3			
South					52		
Shore, general	771	560	830	874	950	1,019	316
Total	4,032	4,223	4,866	4,533	4,090	5,050	6,556
Grand total	4,622	4,290	4,981	4,738	4,573	5,270	6,945

Fishing grounds	August	September	October	November	December	Total
Newfoundland:						
Grand Bank	72		26			426
Green Bank		59				59
St. Peters Bank						48
Bay of Islands						178
Total	72	59	26			711
Off Canada:						
Bay of Fundy						11
Seal Island Grounds	20	7	12			39
Laborador coast						46
Gulf of St. Lawrence	29	54	29			138
Scatari Bank						25
Quereau Bank						23
Sable Island Bank (Western Bank)					131	432
Cape Shore	59	262	40	102	61	713
Emerald Bank			12		15	72
La Have Bank	102	97	31	422	255	1,743
Roseway Bank				12	24	49
Total	210	420	124	536	486	3,291
Off United States:						
Browns Bank	699	505	199	119	564	5,005
Georges Bank	1,977	1,568	1,526	1,289	1,491	25,069
Clark Bank						7
South Channel	1,584	1,681	1,811	1,267	738	13,358
Off Chatham	336	115	20	29	20	595
Nantucket Shoals	216	194	130	100	262	1,750
Cashes Bank	6	3	23	44	40	273
Fippenies Bank			4	3	3	21
Platts Bank			4			29
Jeffreys Ledge	46	145	169	98	127	924
Middle Bank (Stellwagen Bank)		130	14	23	46	315
South						52
Shore, general	505	1,019	830	1,551	836	10,061
Total	5,369	5,360	4,730	4,523	4,127	57,459
Grand total	5,651	5,839	4,880	5,059	4,613	61,461

MACKEREL FISHERY OF THE ATLANTIC COAST

The 1930 mackerel catch totalled 43,156,885 pounds, an amount that has been exceeded only twice in the last 40 years. The season was characterized by good runs of medium and large fish in the southern area off Block Island, and in South Channel up to the end of July. At that time the catch was 42 per cent above that of the previous year. Then the large fish disappeared and small yearlings made up most of the catch during August, September, and October. They were not exceedingly abundant and the catch dropped off severely. In fact, landings during October were almost negligible. The net fishery off Cape Ann in November yielded only moderate quantities.

Statistical summaries appear in the accompanying tables. As heretofore, only the purse seine and drift gill net fisheries have been included. They have been designated as "seiners" and "netters," respectively. Because of their importance in certain seasons, boats under 5 net tons and fishing with purse seines or gill nets have been included insofar as data were available. The catch of shore gear, such as pound nets and traps, were omitted. Practically all of the statistics were collected by the bureau's agents at Cape May, N. J., New York City, N. Y., Boston, Gloucester, and Woods Hole, Mass., and Portland, Me. A few of the landings, particularly at ports not having a bureau representative, were secured from unofficial sources and often consist of estimated, rather than "weighed-out" fares. The error involved is probably well under 5 per cent in the vessel fishery. The figures on the boat fishery are probably less complete. The catch of bull's-eye mackerel, *Scomber colias*, was not included. It amounted to 450,140 pounds as compared with 54,170 pounds in the previous year.

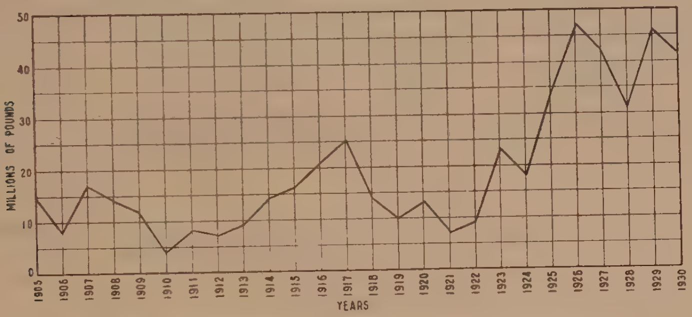

FIGURE 15.—Catch of mackerel in the North Atlantic fishery, 1905–1930

Southern fishery.—This includes the catch of mackerel in waters off New York, New Jersey, Delaware, Maryland, and Virginia. The area is bounded on the east by longitude 72° W., which passes through the eastern end of Long Island about 9 miles west of Montauk Point.

Most of the vessels participating in this fishery sailed south from Gloucester during the first and second weeks of April. The first catch was made by netters on April 9 and landed at Wildwood, N. J., on April 10.

At this season of the year the seiners operate only on dark nights. The netters may fish on both dark and moonlit nights, but usually most of their landings are concentrated during the bright-night periods. In 1930 the bright nights were from April 10 to 18 and May 4 to 12, preventing the seiners from fishing at the beginning and the end of the normal southern fishery.

Fifty-one vessels went south for this fishery, 22 fishing regularly from April 19 to May 29. Altogether the seining fleet landed 3,341,362 pounds as compared with 3,233,521 pounds in the previous year.

Netters operated in this area from April 9 to June 6, 40 vessels fishing regularly. Together with 11 other vessels, they caught 3,874,147 pounds as compared with 2,952,938 pounds in 1929. Doubtless the netter catch would have been larger had it not been for bad weather in the early days of the season.

Block Island fishery.—This includes the operations off southern New England between longitude 72° W., and a line drawn 145° from true north from Sankaty Head, Nantucket.

Most of the seining took place in this area between May 19 and June 24 with a few vessels continuing as late as July 9. During this period 53 vessels fished regularly while 24 others participated part of the time. With seining continuing longer than usual, the catch aggregated 8,309,180 pounds as compared with 3,004,270 pounds in 1929.

During the summer, especially the latter part when mackerel were scarce, six more trips totaling 74,820 pounds were landed from this area.

Netters, from May 12 to June 7, with a few continuing to June 25, caught 227,174 pounds in this area as compared with 246,860 in the previous year.

Gulf of Maine.—This region includes all of the waters from Nantucket Shoals to Nova Scotia. Most of the mackerel seining was done in the offing of Cape Cod and in Massachusetts Bay. Some mackerel were caught from Thatchers Island north to Monhegan, Me., but the fishing to the northward was not particularly good.

Most of the seiners shifted their fishing operations from the Block Island region to the Gulf of Maine about June 22, but a few trips were made as early as May 30.

There was an exceptionally good run of large and medium mackerel during the latter part of June and up to the end of July, but thereafter the fishing became poor and most of the landings consisted of small fish.

Due to the dearth of mackerel and unusually bad weather many of the seiners pulled out of the fishery during October, only a few landing trips during the latter half of the month. There were 98 seiners fishing in this region, 65 of them continuing regularly during most of the season. Up to July 31 the catch was ahead of the previous year, but as a result of the decrease which occurred during the late summer the seine catch was 26,137,851 pounds as compared with 35,072,022 in 1929.

During the month of June, nine netters caught 138,290 pounds compared to 165,312 pounds during the equivalent period the previous year.

The fall netting season lasted from about the middle of October to the middle of December with the catch very light during the last several weeks; 75 vessels, of which 52 fished regularly, landed 993,461 pounds as compared with 566,712 the previous year.

Cape Shore fishery.—Due to the exceptionally good fishing in the Block Island region during June, only two seiners made trips to the offing of Nova Scotia in 1930. Their catch, landed June 9 and 10, amounted to 60,600 pounds, as compared with 884,900 pounds landed in 15 trips during the previous year.

Mackerel fishery of the Atlantic coast, 1930

CATCH: BY PORTS IN 5-DAY PERIODS[1]

Date	Cape May, Wildwood, Atlantic City	New York	Newport, New Bedford, Woods Hole, Provincetown[2]	Boston	Gloucester	Portland	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Apr. 6-10	1,050						1,050
Apr. 11-15	14,534						14,534
Apr. 16-20	189,000						189,000
Apr. 21-25	810,171	144,665					954,836
Apr. 26-30	1,313,022	199,568					1,512,590
May 1-5	296,753	598,245					894,998
May 6-10	349,002	825,880		281,935			1,456,817
May 11-15	18,300	1,076,570	141,563				1,236,433
May 16-20		397,034	175,301	203,950			776,285
May 21-25		152,684	276,315	1,085,900	168,970	19,928	1,703,797
May 26-31		138,500	177,532	1,788,020	305,575	49,300	2,458,927
June 1-5		40,000	138,398	615,965	92,420	22,160	908,943
June 6-10		35,000	135,550	854,735	39,590	316	1,065,191
June 11-15			53,615	444,445	19,310		517,370
June 16-20		45,000	147,475	1,027,668	35,095	7,117	1,262,355
June 21-25		13,000	113,375	1,213,885	81,620	112,813	1,534,693
June 26-30			21,000	977,298	466,486	11,325	1,476,109
July 1-5				1,097,425	538,430		1,635,855
July 6-10		15,000	22,500	1,547,215	521,800	2,310	2,108,825
July 11-15			82,000	1,486,635	933,550	70,000	2,572,185
July 16-20			18,000	1,225,855	804,660	103,200	2,151,715
July 21-25			103,000	1,656,185	1,313,710	37,675	3,110,570
July 26-31			116,000	1,075,520	993,160	70,531	2,255,211
Aug. 1-5			95,000	416,940	402,090	2,535	916,565
Aug. 6-10			2,000	212,735	28,490	17,327	260,552
Aug. 11-15			15,000	507,575	55,410	8,828	586,813
Aug. 16-20			9,240	597,330	122,280	80,640	809,490
Aug. 21-25				86,645	5,010	1,795	93,450
Aug. 26-31			17,000	729,150	30,850	965	777,965
Sept. 1-5			4,000	679,165	360,830	58,690	1,102,685
Sept. 6-10			135	70,520	45,460	31,282	147,397
Sept. 11-15			3,000	345,856	141,580		490,436
Sept. 16-20				632,877	73,415		706,292
Sept. 21-25			107,000	1,170,600	1,183,260		2,460,860
Sept. 26-30			80,000	605,150	447,130	8,250	1,140,530
Oct. 1-5				283,405	142,040		425,445
Oct. 11-15				16,745	26,268		43,013
Oct. 16-20				322,570	79,438		402,008
Oct. 21-25				5,445	11,224		16,669
Oct. 26-31				10,300	39,892		50,192
Nov. 1-5				10,290	59,891	3,105	73,286
Nov. 6-10				14,765	54,470		69,235
Nov. 11-15				25,085	81,483	8,212	114,780
Nov. 16-20					22,825	420	23,245
Nov. 21-25				80,030	220,243	4,285	304,558
Nov. 26-30				115,888	95,708		211,596
Dec. 1-5				27,480	79,391		106,871
Dec. 6-10				2,190	10,640		12,830
Dec. 11-15					11,223		11,223
Dec. 16-20					610		610
Total	2,991,832	3,681,146	2,053,999	23,551,372	10,145,527	733,009	43,156,885

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[1] The landings at the ports of Boston, Gloucester, and Portland vary somewhat from those published under "Vessel fisheries at principal New England ports," in the annual reports of the division of fishery industries, due to the inclusion of landings of some small boats in the above data and also to different methods in the collection of the statistics.

[2] Practically all items in this column up to June 25 were landed at Newport, New Bedford, and Woods Hole; after June 25, at Provincetown.

Mackerel fishery of the Atlantic coast, 1930—Continued

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS

Designation	Vessels and boats	Tonnage	Crew	Trips	Total catch
SOUTHERN					
Seiners:	*Number*	*Net tons*	*Number*	*Number*	*Pounds*
Regular vessels	22	912	281	114	1, 952, 045
Miscellaneous vessels	29	1, 028	355	79	1, 387, 217
Miscellaneous boats				1	2, 100
Netters:					
Regular vessels	40	735	272	296	3, 167, 618
Miscellaneous vessels	11	146	55	39	369, 922
Miscellaneous boats				58	336, 607
Total	[1] 102			587	7, 215, 509
BLOCK ISLAND					
Seiners:					
Regular vessels	53	1, 837	642	356	7, 773, 055
Miscellaneous vessels	24	659	254	46	534, 585
Miscellaneous boats				1	1, 540
Netters:					
Regular vessels	4	51	22	14	66, 811
Miscellaneous vessels	21	314	138	29	142, 693
Miscellaneous boats				12	17, 670
Total	[1] 100			458	8, 536, 354
GULF OF MAINE					
Seiners: [2]					
Regular vessels	65	2, 074	764	1, 047	23, 661, 537
Miscellaneous vessels	33	655	284	186	2, 517, 427
Miscellaneous boats				12	33, 707
Netters:					
Spring—					
Regular vessels	2	40	11	10	37, 165
Miscellaneous vessels	7	93	35	17	69, 910
Miscellaneous boats				23	31, 215
Fall—					
Regular vessels	52	1, 248	378	637	841, 376
Miscellaneous vessels	23	423	170	69	80, 905
Miscellaneous boats				127	71, 180
Total	[1] 155			2, 128	27, 344, 422
CAPE SHORE					
Seiners:					
Regular vessels	2	119	29	2	60, 600
Total seiners	[1] 106			1, 844	37, 923, 813
Total netters	[1] 116			1, 331	5, 233, 072
Grand total	[1] 173			3, 175	43, 156, 885

[1] Exclusive of boats and of duplication.

[2] Includes 6 trips from Block Island.

Landings of mackerel on the Atlantic coast, 1905–1930

Year	Pounds [1]	Year	Pounds [1]
1905	15, 398, 070	1918	13, 915, 200
1906	8, 106, 960	1919	9, 990, 690
1907	16, 902, 270	1920	13, 292, 040
1908	14, 376, 990	1921	6, 923, 790
1909	11, 702, 190	1922	8, 797, 680
1910	3, 909, 150	1923	23, 390, 580
1911	8, 322, 060	1924	18, 237, 120
1912	7, 011, 240	1925	33, 953, 490
1913	9, 327, 330	1926	47, 126, 100
1914	14, 477, 970	1927	41, 998, 600
1915	16, 051, 170	1928	30, 983, 880
1916	20, 642, 580	1929	46, 166, 345
1917	25, 473, 540	1930	43, 156, 885

[1] Represents the weight of mackerel landed in the round plus the weight of mackerel landed salted which has been converted to the equivalent of fresh mackerel in the round.

FISHERIES OF THE MIDDLE ATLANTIC STATES

During 1929 the value of the catch of fishery products in the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) exceeded that in any year for which there are records. This was due mainly to the increased production of oysters. These fisheries gave employment to 10,491 fishermen or 5 per cent more than in 1926, the most recent year for which records are available prior to 1929. Of the total number of fishermen employed during 1929, 4,787 regular fishermen were engaged on vessels, and 2,756 regular and 2,948 casual fishermen were employed in the shore and boat fisheries. Their catch amounted to 190,772,611 pounds, valued at $14,137,608. This is an increase of 14 per cent in the catch and 13 per cent in the value of the catch as compared with the quantity and its value for 1926. Of the total catch in 1929, 120,024,529 pounds, valued at $3,732,564, were fish; and 70,748,082 pounds, valued at $10,405,044, were shellfish and miscellaneous products.

Based on the value to the fishermen, oysters with a production of 55,128,765 pounds of meats, valued at $8,089,886, were the most important product. All varieties of clams were second with 3,420,178 pounds of meats, valued at $1,140,998. Other products of importance were bay and sea scallops, 2,286,636 pounds of meats, valued at $528,335; squeteagues or "sea trout," 10,883,804 pounds, valued at $464,800; flounders, 9,954,150 pounds, valued at $441,006; lobsters, 1,425,228 pounds, valued at $376,251; butterfish, 5,619,956 pounds, valued at $373,959; and bluefish, 3,828,911 pounds, valued at $354,370. Other products were valued individually at less than $300,000.

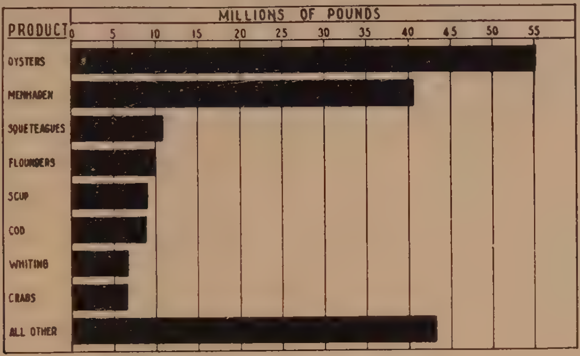

FIGURE 16.—Yield of principal fishery products in the Middle Atlantic States, 1929

The industries related to the fisheries of the Middle Atlantic States gave employment to 4,846 persons, of whom 284 were engaged in transporting fishery products, 3,747 were in the wholesale trade and received $5,347,875 in salaries and wages, and 815 were in the manufacturing industry and received $891,225 in salaries and wages. There were 345 establishments in the wholesale trade handling primary products and 56 were in the manufacturing industry. The latter manufactured products, valued at $8,174,922, consisting principally of marine-shell products from imported shell, mussel-shell products from fresh-water shell, canned sturgeon caviar, and canned clams.

Fisheries of the Middle Atlantic States, 1929

SUMMARY OF CATCH

Products	New York		New Jersey		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	31, 734, 982	$1, 323, 663	56, 626, 605	$2, 165, 040	41, 904	$9, 388
Shellfish, etc	15, 524, 182	3, 737, 952	53, 374, 459	6, 565. 584	----------	--------
Total	47, 259, 164	5, 061, 615	110, 001, 064	8, 730, 624	41, 904	9, 388

Products	Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	31, 621, 038	$234, 473	120, 024, 529	$3, 732, 564
Shellfish, etc	1, 849, 441	101, 508	70, 748, 082	10, 405, 044
Total	33, 470, 479	335, 981	190, 772, 611	14, 137, 608

OPERATING UNITS: BY STATES

Items	New York	New Jersey	Pennsylvania	Delaware	Total
Fisherman:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	808	3, 334	----------	645	4, 787
On boats and shore—					
Regular	1, 226	1, 405	2	123	2, 756
Casual	1, 133	1, 270	51	494	2, 948
Total	3, 167	6, 009	53	1, 262	10, 491
Vessels:					
Steam	4	----------	----------	15	19
Net tonnage	548	----------	----------	2, 008	2, 556
Motor	177	287	----------	15	479
Net tonnage	2, 381	4, 338	----------	254	6, 973
Sail	4	79	----------	2	85
Net tonnage	32	2, 104	----------	34	2, 170
Total vessels	185	366	----------	32	583
Total net tonnage	2, 961	6, 442	----------	2, 296	11, 699
Boats:					
Motor	586	1, 117	5	92	1, 800
Other	1, 151	969	15	234	2, 369
Accessory boats	102	76	----------	49	227
Apparatus:					
Purse seines—					
Menhaden	5	2	----------	16	23
Length, yards	1, 700	585	----------	4, 980	7, 265
Other	1	15	----------	----------	16
Length, yards	660	6, 230	----------	----------	6, 890
Haul seines—					
Common	152	126	11	86	375
Length, yards	21, 708	13, 695	1, 370	24, 445	61, 218
Gill nets—					
Anchor	176	181	----------	----------	357
Square yards	34, 917	34, 760	----------	----------	69, 677
Drift	577	722	10	110	1, 419
Square yards	484, 367	920, 355	38, 200	202, 013	1, 644, 935
Runaround	34	37	----------	15	86
Square yards	58, 120	164, 200	----------	23, 540	245, 860
Stake	118	339	----------	128	585
Square yards	49, 022	66, 728	----------	15, 872	131, 622
Lines—					
Hand	126	570	1	16	713
Hooks	3, 174	7, 340	1	30	10, 545
Trawl	1, 609	268	----------	4	1, 881
Hooks	277, 755	364, 800	----------	1, 750	644, 305
Troll	8	478	----------	----------	486
Hooks	8	478	----------	----------	486
Trot with baits or snoods	----------	4	----------	38	42
Baits or snoods	----------	4, 050	----------	3, 580	7, 630
Trot with hooks	29	7	----------	2	38
Hooks	3, 985	2, 600	----------	600	7, 185

Fisheries of the Middle Atlantic States, 1929—Continued

OPERATING UNITS: BY STATES—Continued

Items	New York	New Jersey	Pennsylvania	Delaware	Total
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets	445	181		11	637
Wiers		10			10
Stop nets	18	52	1	14	85
Square yards	8, 871	125, 916	1, 600	4, 480	140, 867
Fyke nets	2, 532	1, 707	30	504	4, 773
Dip nets	57	32		10	99
Cast nets		4		13	17
Scap nets	154				154
Bag nets		31			31
Yards at mouth		360			360
Drag nets	17	2			19
Yards at mouth	40	1			41
Push nets	29				29
Otter trawls—					
Fish	130	86			216
Yards at mouth	3, 273	2, 062			5, 335
Shrimp	2	6			8
Yards at mouth	62	128			190
Pots—					
Crab	23			51	74
Eel	4, 490	2, 803		566	7, 859
Lobster	19, 540	27, 933		200	47, 673
Harpoons	21				21
Spears	111	60		16	187
Dredges—					
Clam	13	18		22	53
Yards at mouth	10	25		26	61
Crab		2			2
Yards at mouth		8			8
Oyster	111	536		30	677
Yards at mouth	144	631		37	812
Scallop	1, 099	3			1, 102
Yards at mouth	1, 140	6			1, 146
Tongs	582	915		140	1, 637
Rakes	465	574		6	1, 045
Forks	406	6			412
Hoes		54			54
Gaffs		46		7	53

Fisheries of the Middle Atlantic States, 1929—Continued

CATCH: BY STATES

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH										
Albacore	52, 500	$1, 005	23, 321	$1, 121					75, 821	$2, 126
Alewives	852, 930	13, 663	248, 214	4, 630	5, 000	$175	121, 700	$2, 230	1, 227, 844	20, 702
Bluefish	838, 834	81, 660	2, 959, 577	266, 358			30, 500	6, 352	3, 828, 911	354, 370
Bonito	149, 759	9, 133	762, 655	48, 567					912, 414	57, 700
Butterfish	604, 772	52, 809	5, 013, 124	320, 993			2, 060	157	5, 619, 956	373, 959
Carp	155, 705	22, 538	182, 255	30, 596	3, 512	470	117, 588	15, 734	459, 060	69, 338
Catfish and bullheads	13, 075	2, 426	86, 142	7, 862	2, 232	240	24, 191	2, 071	125, 640	12, 599
Cod	2, 860, 017	109, 270	5, 997, 044	143, 581			14, 880	834	8, 871, 941	253, 685
Croaker	340, 000	13, 600	2, 177, 727	72, 927			522, 365	15, 249	3, 040, 092	101, 776
Cunner	1, 200	72							1, 200	72
Cusk			12, 430	268					12, 430	268
Dolphin			100	5					100	5
Drum:										
Black			25, 500	474			600	14	26, 100	488
Red			26, 600	432			2, 250	87	28, 850	519
Eels	623, 995	85, 042	263, 323	30, 847	1, 330	200	31, 298	4, 016	919, 946	120, 105
Flounders	7, 049, 831	276, 394	2, 874, 717	163, 003			29, 602	1, 609	9, 954, 150	441, 006
Goosefish			3, 000	90					3, 000	90
Grayfish	2, 500	50	36, 105	502					38, 605	552
Groupers			6, 150	285					6, 150	285
Haddock	5, 801, 420	191, 288							5, 801, 420	191, 288
Hake	96, 662	2, 168	538, 356	11, 212					635, 018	13, 380
Halibut	5, 288	975							5, 288	975
Herring, sea	14, 640	327	41, 274	872					55, 914	1, 199
Hickory shad			2, 450	48			800	80	3, 250	128
Jewfish			2, 000	100					2, 000	100
King whiting or "kingfish"	4, 158	594	52, 408	4, 410			2, 037	205	58, 603	5, 209
Mackerel	697, 500	35, 694	1, 044, 881	52, 861					1, 742, 381	88, 555
Menhaden	4, 765, 000	27, 363	6, 327, 119	29, 394			29, 454, 120	112, 311	40, 546, 239	169, 068
Minnows	171, 065	5, 870							171, 065	5, 870
Mullet			7, 330	435			15, 900	1, 585	23, 230	2, 020
Mummichog	82, 350	9, 791							82, 350	9, 791
Pigfish			2, 000	100					2, 000	100
Pike or pickerel	435	82					550	100	985	182
Pilotfish			3, 700	136					3, 700	136
Pollock	66, 157	1, 787	32, 623	849					98, 780	2, 636
Pompano			150	60					150	60
Rosefish	150	3							150	3
Scup or porgy	1, 138, 398	37, 158	7, 853, 598	182, 411			1, 600	80	8, 993, 596	219, 649
Sea bass	278, 280	22, 426	2, 947, 114	156, 689					3, 225, 394	179, 115
Sea robin	23, 208	645	40, 100	839					63, 308	1, 484

Shad	164, 564	27, 052	342, 416	68, 008	21, 880	7, 430	93, 559	15, 252	622, 419	117, 742
Sharks	1, 000	20	32, 524	731	-----	-----	-----	-----	33, 524	751
Sheepshead	-----	-----	500	25	-----	-----	-----	-----	500	25
Silversides	223, 415	11, 068	-----	-----	-----	-----	-----	-----	223, 415	11, 068
Skates	29, 151	751	63, 721	1, 104	-----	-----	-----	-----	92, 872	1, 855
Smelt	8, 830	2, 295	-----	-----	-----	-----	-----	-----	8, 830	2, 295
Snapper, red	-----	-----	18, 200	5, 570	-----	-----	-----	-----	18, 200	5, 570
Spanish mackerel	-----	-----	77, 793	9, 712	-----	-----	-----	-----	77, 793	9, 712
Spot	2, 700	216	263, 896	10, 592	-----	-----	26, 229	1, 445	292, 825	12, 253
Squeteagues or "sea trout"	648, 602	57, 593	9, 218, 660	367, 628	-----	-----	1, 016, 542	39, 579	10, 883, 804	464, 800
Striped bass	156, 167	29, 624	40, 589	7, 817	-----	-----	10, 454	2, 213	207, 210	39, 654
Sturgeon	2, 905	532	8, 451	2, 366	-----	-----	10, 560	2, 610	21, 916	5, 508
Suckers	50, 680	6, 442	70, 140	7, 972	7, 950	869	1, 780	227	130, 550	15, 510
Sunfish	1, 600	205	-----	-----	-----	-----	-----	-----	1, 600	204
Swordfish	324, 134	34, 471	-----	-----	-----	-----	-----	-----	324, 134	34, 471
Tautog	72, 732	5, 351	37, 790	1, 507	-----	-----	3, 500	140	114, 022	6, 998
Thimble-eyed mackerel	-----	-----	405, 342	7, 312	-----	-----	-----	-----	405, 342	7, 312
Tilefish	2, 643, 560	115, 358	-----	-----	-----	-----	-----	-----	2, 643, 560	115, 358
Tomcod	142, 380	6, 296	4, 300	100	-----	-----	-----	-----	146, 680	6, 396
Tuna or "horse mackerel"	810	97	112, 794	8, 216	-----	-----	-----	-----	113, 604	8, 313
Wahoo	-----	-----	2, 000	100	-----	-----	-----	-----	2, 000	100
Whitebait	92, 900	6, 745	-----	-----	-----	-----	-----	-----	92, 900	6, 745
White perch	23, 485	3, 802	93, 365	13, 172	-----	-----	65, 449	8, 576	182, 299	25, 550
Whiting	450, 500	11, 390	6, 198, 891	114, 126	-----	-----	-----	-----	6, 649, 391	125, 516
Wolffish	1, 458	37	-----	-----	-----	-----	-----	-----	1, 458	37
Yellow perch	3, 580	486	42, 146	6, 025	-----	-----	20, 924	1, 717	66, 650	8, 228
Total	31, 734, 982	1, 323, 663	56, 626, 605	2, 165, 040	41, 904	9, 388	31, 621, 038	234, 473	120, 024, 529	3, 732, 564
SHELLFISH, ETC.										
Crabs:										
Hard	113, 486	5, 744	181, 403	8, 433	-----	-----	37, 390	2, 552	332, 279	16, 729
King	-----	-----	5, 708, 000	13, 473	-----	-----	552, 000	966	6, 260, 000	14, 439
Rock	770	96	-----	-----	-----	-----	-----	-----	770	96
Soft	3, 150	1, 056	6, 151	2, 497	-----	-----	16, 800	3, 600	26, 101	7, 153
Lobsters	647, 061	173, 589	765, 567	198, 882	-----	-----	12, 600	3, 780	1, 425, 228	376, 251
Shrimp	105, 580	10, 518	448, 500	20, 992	-----	-----	-----	-----	554, 080	31, 510
Squid	425, 830	19, 870	476, 329	16, 317	-----	-----	-----	-----	902, 159	36, 187
Clams:										
Hard, public	900, 232	426, 911	1, 287, 576	448, 503	-----	-----	18, 312	5, 807	2, 206, 120	881, 221
Hard, private	36, 000	7, 875	67, 222	25, 975	-----	-----	43, 200	16, 000	146, 422	49, 850
Razor	2, 800	689	-----	-----	-----	-----	-----	-----	2, 800	689
Soft, public	586, 410	131, 189	229, 810	42, 693	-----	-----	-----	-----	816, 220	173, 882
Surf or skimmers	204, 616	28, 281	44, 000	7, 075	-----	-----	-----	-----	248, 616	35, 356
Conchs	51, 138	4, 236	14, 634	1, 140	-----	-----	-----	-----	65, 772	5, 376
Mussels	165, 600	8, 280	18, 750	1, 816	-----	-----	1, 050	150	185, 400	10, 246
Oysters:										
Market, public	291, 648	93, 091	476, 561	91, 265	-----	-----	99, 610	11, 482	867, 819	195, 838
Market, private	8, 900, 691	2, 072, 651	15, 048, 482	3, 235, 876	-----	-----	4, 900	925	23, 954, 073	5, 309, 452
Seed, public	216, 020	28, 650	28, 365, 569	2, 416, 264	-----	-----	1, 050, 385	55, 309	29, 631, 974	2, 500, 223
Seed, private	510, 748	69, 964	164, 151	14, 409	-----	-----	-----	-----	674, 899	84, 373

Fisheries of the Middle Atlantic States, 1929—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SHELLFISH, ETC.—continued										
Scallops:										
Bay	619,626	$178,391							619,626	$178,391
Sea	1,610,310	334,194	56,700	$15,750					1,667,010	349,944
Frogs							355	$91	355	91
Terrapin			2,946	3,057					2,946	3,057
Turtles			12,108	1,167			12,839	846	24,947	2,013
Bloodworms	74,256	84,464							74,256	84,464
Sandworms	58,210	58,213							58,210	58,213
Total	15,524,182	3,737,952	53,374,459	6,565,584			1,849,441	101,508	70,748,082	10,405,044
Grand total	47,259,164	5,061,615	110,001,064	8,730,624	41,904	$9,388	33,470,479	335,981	190,772,611	14,137,608

NOTE.—Of the above catch, all the dolphin, groupers, jewfish, red snapper, and wahoo were taken off the coast of Florida, and, in addition, 61,330 pounds of bluefish, valued at $4,200; 4,000 pounds of bonito, valued at $440; 9,500 pounds of king whiting, valued at $190; 71,000 pounds of sea bass, valued at $3,490; 4,500 pounds of Spanish mackerel, valued at $470; and 445,300 pounds of shrimp, valued at $20,192.

Fisheries of the Middle Atlantic States, 1929—Continued

PRODUCTION OF CERTAIN SHELLFISH SHOWN IN NUMBERS AND BUSHELS

Products	New York		New Jersey		Delaware		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:								
Hard..........number..	340,458	$5,744	544,209	$8,433	112,170	$2,552	993,837	$16,729
Soft..........do....	9,450	1,056	18,453	2,497	50,400	3,600	78,303	7,153
King..........do....			1,427,000	13,473	138,000	966	1,565,000	14,439
Clams:								
Hard, public......bushels..	112,529	426,911	160,947	448,503	2,289	5,807	275,765	881,221
Hard, private........do....	4,500	7,875	8,403	25,975	5,400	16,000	18,303	49,850
Razor..........do....	280	689					280	689
Soft, public..........do....	58,641	131,189	22,981	42,693			81,622	173,882
Surf or skimmers......do....	25,577	28,281	5,500	7,075			31,077	35,356
Conchs..........do....	2,841	4,236	813	1,140			3,654	5,376
Mussels..........do....	3,312	8,280	375	1,816	21	150	3,708	10,246
Oysters:								
Market, public......do....	41,664	93,091	68,080	91,265	14,230	11,482	123,974	195,838
Market, private.....do....	1,271,527	2,072,651	2,149,783	3,235,876	700	925	3,422,010	5,309,452
Seed, public..........do....	30,860	28,650	4,052,224	2,416,264	150,055	55,309	4,233,139	2,500,223
Seed, private..........do....	72,964	69,964	23,450	14,409			96,414	84,373
Scallops:								
Bay..........do....	103,271	178,391					103,271	178,391
Sea..........do....	268,385	334,194	9,450	15,750			277,835	349,944

Industries related to the fisheries of the Middle Atlantic States, 1929

Items	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels..........	55	38		7	100
On boats..........		184			184
Total..........	55	222		7	284
Vessels:					
Motor..........	19	11		2	32
Net tonnage..........	300	197		14	511
Boats..........		221			221
Wholesale:					
Establishments..........	204	82	44	15	345
Persons engaged..........	1,984	1,223	356	184	3,747
Salaries and wages..........	$4,107,117	$536,058	$668,750	$35,950	$5,347,875
Manufacturing:					
Establishments..........	27	15	9	5	56
Persons engaged..........	330	181	121	183	815
Salaries and wages..........	$520,960	$127,943	$188,772	$53,550	$891,225
Products..........	$5,458,479	$1,126,467	$1,171,135	$418,841	$8,174,922

NEW YORK

The fisheries and industries related to the fisheries of New York in 1929 employed 5,536 persons. This is 4 per cent less than the number employed in these fisheries during 1926, which is the most recent year for which comparable data are available. Of the total number of persons, 3,167 were fishermen, 55 were employed on transporting vessels, 1,984 in the wholesale trade, and 330 in manufacturing industries.

The total catch amounted to 47,259,164 pounds, valued at $5,061,615. This is a decrease of 22 per cent in quantity and 1 per cent in value, as compared with the catch and its value for 1926. Of the total value of the catch, that of oysters accounted for 45 per cent; clams, 12 per cent; scallops, 10 per cent; and flounders, 5 per cent. Of the total weight of the catch, that of oysters accounted for 21 per cent; flounders, 15 per cent; haddock, 12 per cent; menhaden, 10 per cent; cod, 6 per cent; scallops, 5 per cent; and clams, 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in New York during 1929 was taken by 3,167 fishermen, who used 177 motor vessels, 4 sailing vessels, 4 steam vessels, 1,737 motor and other small fishing boats, and 19 major types of gear. The vessels had a combined capacity of 2,961 net tons. The fisheries accounting for the greatest number of persons were the fishery with tongs, employing 589 fishermen, and the scallop dredge fishery, employing 479 fishermen.

CATCH BY GEAR

Five types of gear accounted for 80 per cent of the fishery products taken in the marine fisheries of New York in 1929. Listed in order of their importance, they were: Otter trawls, which accounted for 26 per cent of the total catch; dredges, 24 per cent; lines and purse seines, each 11 per cent; and pound nets, 8 per cent. The catch by otter trawls was principally flounders and haddock; that by dredges, principally oysters and scallops; that by lines, principally tilefish and cod; that by purse seines, principally menhaden; and that by pound nets, principally butterfish, flounders, whiting, squid, scup or porgy, and squeteagues.

OPERATING UNITS BY COUNTIES

Suffolk County was foremost in the number of persons fishing, accounting for 49 per cent of the total. Kings County followed with 16 per cent. Other counties employing a considerable number of fishermen were: Nassau, New York, and Ulster. Suffolk County also led in the number of vessels fishing, accounting for 56 per cent of the total. Kings County followed with 24 per cent. Suffolk County accounted for 64 per cent of the total number of motor and other small fishing boats, and Nassau County followed with 11 per cent.

CATCH BY COUNTIES

Fishing was prosecuted along the coast and in the rivers and bays of 18 counties (exclusive of the Great Lakes) during 1929. Ranked according to value, the fisheries of Suffolk County were most important, accounting for 57 per cent of the catch and 63 per cent of the value of the catch. Kings County was next in importance, accounting for 15 per cent of the catch and 13 per cent of the value. Other counties listed in order of their importance were New York and Nassau.

Fisheries of New York, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines		Haul seines	Gill nets			
	Menhaden	Other		Anchor	Drift	Run-around	Stake
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fisherman:							
On vessels	92	12		2	32	14	
On boats and shore—							
Regular			134	36	22	37	34
Casual			233	33	203	4	43
Total	92	12	367	71	257	55	77
Vessels:							
Motor—							
5 to 10 tons				1		4	
11 to 20 tons	3				3	1	
21 to 30 tons	1	1			1		
Total	4	1		1	4	5	
Net tonnage	67	29		8	62	43	
Steam—							
31 to 40 tons	1						
Total	1						
Net tonnage	35						
Total vessels	5	1		1	4	5	
Total net tonnage	102	29		8	62	43	
Boats:							
Motor			16	15	29	18	11
Other			116	15	82	11	62
Accessory boats	9	2			11	3	
Apparatus:							
Number	5	1	152	176	577	34	118
Length, yards	1,700	660	21,708				
Square yards				34,917	484,367	58,120	49,022

Items	Lines				Pound nets	Stop nets	Fyke nets	Dip nets	Scap nets
	Hand	Trawl	Troll	Trot with hooks					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	91	104			8		11		
On boats and shore—									
Regular	39	123	3	1	138	5	88	51	4
Casual	17	6	1	27	15	21	58	6	150
Total	147	233	4	28	161	26	157	57	154
Vessels:									
Motor—									
5 to 10 tons	9	10			4		5		
11 to 20 tons	3	4							
21 to 30 tons	2	1							
41 to 50 tons		2							
51 to 60 tons	1	1							
Total	15	18			4		5		
Net tonnage	212	288			23		33		
Total vessels	15	18			4		5		
Total net tonnage	212	288			23		33		
Boats:									
Motor	41	50	2		51		32		
Other	8	10		28	128	17	105	54	119
Accessory boats	42	63							
Apparatus:									
Number	126	1,609	8	29	445	18	2,532	57	154
Square yards						8,871			
Hooks, baits, or snoods	3,174	277,755	8	3,985					

Fisheries of New York, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Drag nets	Push nets	Otter trawls		Pots			Harpoons
			Fish	Shrimp	Crab	Eel	Lobster	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5	--------	201	11	--------	4	7	34
On boats and shore—								
Regular	13	25	103	--------	--------	109	193	26
Casual	2	4	18	--------	3	38	18	--------
Total	20	29	322	11	3	151	218	60
Vessels:								
Motor—								
5 to 10 tons	1	--------	38	1	--------	2	4	3
11 to 20 tons	1	--------	11	1	--------	--------	--------	2
21 to 30 tons	--------	--------	6	--------	--------	--------	--------	2
31 to 40 tons	--------	--------	1	--------	--------	--------	--------	--------
Total	2	--------	56	2	--------	2	4	7
Net tonnage	22	--------	623	20	--------	16	28	99
Steam—								
201 to 210 tons	--------	--------	1	--------	--------	--------	--------	--------
261 to 270 tons	--------	--------	1	--------	--------	--------	--------	--------
Total	--------	--------	2	--------	--------	--------	--------	--------
Net tonnage	--------	--------	477	--------	--------	--------	--------	--------
Total vessels	2	--------	58	2	--------	2	4	7
Total net tonnage	22	--------	1,100	20	--------	16	28	99
Boats:								
Motor	--------	--------	72	--------	--------	45	128	13
Other	12	24	--------	--------	3	89	1	12
Accessory boats	--------	--------	--------	--------	--------	--------	--------	12
Apparatus:								
Number	17	29	130	2	23	4,490	19,540	21
Yards at mouth	40	--------	3,273	62	--------	--------	--------	--------

Items	Spears	Dredges			Tongs	Rakes	Forks	By hand	Total, exclusive of duplication
		Clam	Oyster	Scallop					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	15	226	159	54	2	--------	--------	808
On boats and shore—									
Regular	73	9	8	178	447	333	261	73	1,226
Casual	38	1	--------	142	88	131	145	9	1,133
Total	111	25	234	479	589	466	406	82	3,167
Vessels:									
Motor—									
5 to 10 tons	--------	5	17	23	25	1	--------	--------	96
11 to 20 tons	--------	1	17	15	--------	--------	--------	--------	48
21 to 30 tons	--------	--------	12	2	--------	--------	--------	--------	24
31 to 40 tons	--------	--------	2	--------	--------	--------	--------	--------	3
41 to 50 tons	--------	--------	2	--------	--------	--------	--------	--------	4
51 to 60 tons	--------	--------	1	--------	--------	--------	--------	--------	2
Total	--------	6	51	40	25	1	--------	--------	177
Net tonnage	--------	48	903	438	157	6	--------	--------	2,381
Sail—									
5 to 10 tons	--------	--------	--------	2	1	--------	--------	--------	3
11 to 20 tons	--------	--------	--------	1	--------	--------	--------	--------	1
Total	--------	--------	--------	3	1	--------	--------	--------	4
Net tonnage	--------	--------	--------	26	6	--------	--------	--------	32
Steam—									
31 to 40 tons	--------	--------	1	--------	--------	--------	--------	--------	2
201 to 210 tons	--------	--------	--------	--------	--------	--------	--------	--------	1
261 to 270 tons	--------	--------	--------	--------	--------	--------	--------	--------	1
Total	--------	--------	1	--------	--------	--------	--------	--------	4
Net tonnage	--------	--------	36	--------	--------	--------	--------	--------	548
Total vessels	--------	6	52	43	26	1	--------	--------	185
Total net tonnage	--------	48	939	464	163	6	--------	--------	2,961
Boats:									
Motor	--------	7	3	18	177	156	--------	--------	586
Other	105	--------	--------	265	283	289	31	1	1,151
Accessory boats	--------	--------	--------	--------	--------	--------	--------	--------	102
Apparatus:									
Number	111	13	111	1,099	582	465	406	--------	--------
Yards at mouth	--------	10	144	1,140	--------	--------	--------	--------	--------

Fisheries of New York, 1929—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets	
	Menhaden		Other				Anchor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					596,950	$7,301		
Bluefish			22,000	$1,800	11,440	1,890	31,810	$4,535
Carp					76,700	10,963	2,180	337
Catfish and bullheads					2,810	487	5	1
Cod					3,300	105		
Eels					63,200	3,538		
Flounders					5,800	580		
Menhaden	4,678,000	$26,285	33,600	168				
Minnows					170,615	5,665		
Mummichog					60,650	7,621		
Pike or pickerel					150	22		
Scup or porgy			500,000	7,500				
Sea bass			60,000	3,000				
Shad					3,618	618		
Silversides					223,115	11,008		
Smelt					6,700	1,922	600	240
Squeteagues			20,000	500	46,450	7,855	79,880	10,130
Striped bass					65,615	15,012	5,960	1,575
Sturgeon							1,890	398
Suckers					12,200	1,473	700	81
Sunfish					340	46		
Whitebait					92,900	6,745		
White perch					5,175	1,102	3,895	466
Yellow perch					200	40		
Shrimp					400	60		
Total	4,678,000	26,285	635,600	12,968	1,448,328	84,053	126,920	17,763

Species	Gill nets						Lines	
	Drift		Runaround		Stake		Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	25,105	$1,145			1,480	$64		
Bluefish			185,690	$19,488	1,000	100	402,480	$40,359
Butterfish			1,700	114				
Carp	835	128			3,630	547		
Cod							206,555	9,240
Flounders							29,500	2,417
Haddock							550	22
Hake							10,640	201
Mackerel	445,275	24,720					16,000	960
Pollock							64,350	1,755
Scup or porgy			900	30			27,200	2,526
Sea bass							77,900	10,628
Shad	149,328	24,547			10,067	1,679		
Squeteagues			101,425	10,188	14,500	725	44,600	5,330
Striped bass			1,500	300	840	205	7,400	615
Sturgeon	600	67			205	46		
Suckers					4,060	589		
Tautog							28,050	3,065
Tilefish							575,000	22,500
White perch					2,665	333		
Whiting							500	30
Total	621,143	50,607	291,215	30,120	38,447	4,288	1,490,725	99,648

Fisheries of New York, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines						Pound nets	
	Trawl		Troll		Trot with hooks			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore							52, 500	$1, 005
Alewives							137, 860	2, 122
Bluefish	1, 540	$140	1, 760	$250			180, 894	13, 078
Bonito							149, 759	9, 133
Butterfish							601, 817	52, 607
Carp					230	$41		
Catfish and bullheads					330	56		
Cod	1, 694, 190	71, 975					27, 416	1, 270
Cunner							1, 200	72
Eels	5, 200	780			2, 130	349	190, 650	27, 227
Flounders	1, 000	100					568, 898	29, 941
Grayfish	2, 500	50						
Haddock	26, 796	1, 076						
Hake	16, 918	566						
Herring, sea							14, 640	327
King whiting or "kingfish"							4, 158	594
Mackerel							236, 225	10, 014
Menhaden							53, 400	910
Pollock							683	16
Scup or porgy							422, 598	23, 658
Sea bass							14, 550	1, 475
Sea robin							23, 208	645
Shad							1, 446	184
Sharks							1, 000	20
Skates	20, 850	585					8, 301	166
Spot							2, 700	216
Squeteagues							340, 227	22, 808
Striped bass							74, 622	11, 901
Suckers					15	2		
Tautog							22, 482	1, 469
Tilefish	2, 068, 560	92, 858						
Tuna or "horse mackerel"							810	97
Whiting							450, 000	11, 360
Crabs: Hard							200	100
Squid							425, 830	19, 870
Total	3, 837, 554	168, 130	1, 760	250	2, 705	448	4, 008, 074	242, 285

Species	Stop nets		Fyke nets		Dip nets		Scap nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			49, 115	$568			42, 420	$2, 463
Carp	34, 310	$4, 957	8, 070	1, 025			29, 750	4, 540
Catfish and bullheads			9, 295	1, 769			635	113
Eels			4, 385	916			105	23
Flounders			1, 384, 405	26, 335				
Minnows							450	205
Pike or pickerel			195	38			90	22
Shad							105	24
Smelt			1, 000	92	400	$20	130	21
Striped bass			30	6				
Sturgeon							210	21
Suckers	2, 396	253	23, 490	3, 193			7, 719	836
Sunfish	30	1	915	126			315	31
Tautog			1, 600	136				
Tomcod			142, 380	6, 296				
White perch			10, 435	1, 771			1, 315	130
Yellow perch	15	2	3, 135	411			230	33
Crabs:								
Hard			32, 800	1, 020	21, 599	2, 497		
Soft					3, 150	1, 056		
Shrimp					510	50		
Scallops: Bay					11, 850	2, 708		
Total	36, 751	5, 213	1, 671, 250	43, 702	37, 509	6, 331	83, 474	8, 462

Fisheries of New York, 1929—Continued

CATCH: BY GEAR—Continued

Species	Drag nets		Push nets		Otter trawls			
					Fish		Shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					220	$20		
Butterfish					1, 255	88		
Cod					928, 556	26, 680		
Croaker					340, 000	13, 600		
Flounders	48, 000	$1, 400			5, 010, 428	215, 461		
Haddock					5, 774, 074	190, 190		
Hake					69, 104	1, 401		
Halibut					5, 288	975		
Mummichog			300	$60				
Pollock					1, 124	16		
Rosefish					150	3		
Scup or porgy					187, 700	3, 444		
Sea bass					57, 240	3, 697		
Silversides			300	60				
Squeteagues					1, 520	57		
Striped bass					200	10		
Tautog					20, 600	681		
Wolffish					1, 458	37		
Crabs: Hard					52, 500	1, 575		
Lobster					250	75	18, 000	$720
Shrimp	79, 650	9, 400	20	8			25, 000	1, 000
Clams: Surf					120	11		
Conchs					1, 440	95		
Scallops:								
Bay			20, 250	5, 738				
Sea	9, 900	2, 200			22, 500	4, 375		
Total	137, 550	13, 000	20, 870	5, 866	12, 475, 727	462, 491	43, 000	1, 720

Species	Pots						Harpoons	
	Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			294, 170	$12, 343				
Mummichog			21, 400	2, 110				
Sea bass					68, 590	$3, 626		
Suckers			100	15				
Swordfish							324, 134	$34, 471
Crabs:								
Hard	3, 320	$415			3, 067	137		
Rock			770	96				
Lobster					628, 811	172, 794		
Total	3, 320	415	316, 440	44, 564	700, 468	176, 557	324, 134	34, 471

Species	Spears		Dredges					
			Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	64, 155	$9, 866						
Flounders	1, 800	160						
Clams:								
Hard, public			4, 800	$900				
Hard, private			139, 736	12, 155	36, 000	$7, 875		
Surf							49, 698	$4, 141
Conchs								
Mussels, sea					165, 000	8, 250		
Oysters:								
Market, public					280, 000	90, 000		
Market, private					8, 823, 341	2, 047, 701		
Seed, public					3, 675	525		
Seed, private					510, 748	69, 964		
Scallops:								
Bay							585, 426	169, 329
Sea							1, 577, 910	327, 619
Total	65, 955	10, 026	144, 536	13, 055	9, 818, 764	2, 224, 315	2, 213, 034	501, 089

Fisheries of New York, 1929—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	441,080	$205,322	414,336	$201,726			40,016	$18,963
Razor					2,800	$689		
Soft			348,800	74,275	237,610	56,914		
Surf	64,760	16,115						
Mussels, sea	600	30						
Oysters:								
Market, public	11,648	3,091						
Market, private	77,350	24,950						
Seed, public	94,045	13,475	118,300	14,650				
Scallops: Bay			1,050	308			1,050	308
Bloodworms					74,256	84,464		
Sandworms					58,210	58,213		
Total	689,483	262,983	882,486	290,959	372,876	200,280	41,066	19,271

OPERATING UNITS: BY COUNTIES

Items	Albany	Bronx	Columbia	Dutchess	Greene	Kings	Nassau	New York	Orange
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						197	46	172	
On boats and shore—									
Regular			1	1	1	212	209		2
Casual	23	2	40	109	33	100	82		56
Total	23	2	41	110	34	509	337	172	58
Vessels:									
Motor—									
5 to 10 tons						24	4	4	
11 to 20 tons						12	5	9	
21 to 30 tons						7	2	5	
31 to 40 tons						1		1	
41 to 50 tons								2	
51 to 60 tons								1	
Total						44	11	22	
Net tonnage						559	156	463	
Steam—									
201 to 210 tons								1	
261 to 270 tons								1	
Total								2	
Net tonnage								477	
Total vessels						44	11	24	
Total net tonnage						559	156	940	
Boats:									
Motor				10		93	31		2
Other	13	2	21	54	24	5	161		30
Accessory boats						29	2	56	
Apparatus:									
Purse seines—									
Other than menhaden						1			
Length yards						660			
Haul seines	5		6	5	7	5	17		14
Length, yards	134		683	772	607	65	941		1,534
Gill nets—									
Drift			1	31	1		52	420	10
Square yards			7,387	108,127	1,050		52,700	75,600	27,562
Runaround							12		
Square yards							26,120		
Stake				1					
Square yards				165					
Lines—									
Hand						52		23	
Hooks						3,085		29	
Trawl						42	24	40	
Hooks						89,880	50,325	61,050	
Troll						8			
Hooks						8			
Trot			1	3					4
Hooks			75	650					600

Fisheries of New York, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Albany	Bronx	Columbia	Dutchess	Greene	Kings	Nassau	New York	Orange
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets							4		
Stop nets			3	1	3				1
Square yards			2, 201	267	2, 202				200
Fyke nets	26		44	52	48				59
Dip nets							22		
Scap nets	11		11	31	16				11
Drag nets							3		
Yards at mouth							4		
Push nets							1		
Otter trawls—									
Fish						36	3	7	
Yards at mouth						822	64	227	
Shrimp						2			
Yards at mouth						62			
Pots—									
Eel				2		112	389		10
Lobster						8, 750	3, 605		
Harpoons						1		2	
Spears			2			1	52		
Dredges—									
Clam						12			
Yards at mouth						9			
Oyster							20	18	
Yards at mouth							23	27	
Scallop						38	6	4	
Yards at mouth						107	16	11	
Tongs		2					151		
Rakes							57		
Forks						125	126		

Items	Putnam	Queens	Rensselaer	Richmond	Rockland	Saratoga	Suffolk	Ulster	Westchester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		2		2			386		3
On boats and shore—									
Regular				9			785	3	3
Casual	2	3	19	5	49	2	381	165	62
Total	2	5	19	16	49	2	1, 552	168	68
Vessels:									
Motor—									
5 to 10 tons				1			62		1
11 to 20 tons		1					21		
21 to 30 tons							10		
31 to 40 tons							1		
41 to 50 tons							2		
51 to 60 tons							1		
Total		1		1			97		1
Net tonnage		16		7			1, 172		8
Sail—									
5 to 10 tons							3		
11 to 20 tons							1		
Total							4		
Net tonnage							32		
Steam—									
31 to 40 tons							2		
Total							2		
Net tonnage							71		
Total vessels		1		1			103		
Total net tonnage		16		7			1, 275		
Boats:									
Motor				9	3		425	9	4
Other	2	1	14		24	1	686	85	28
Accessory boats							13		2

Fisheries of New York, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Putnam	Queens	Rensselaer	Richmond	Rockland	Saratoga	Suffolk	Ulster	Westchester
Apparatus:									
Purse seines—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Menhaden							5		
Length, yards							1,700		
Haul seines		1	3	1	5	1	68	10	4
Length, yards		200	434	5	766	117	13,523	1,160	767
Gill nets—									
Anchor					13		35	20	108
Square yards					720		31,529	1,418	1,250
Drift					7			42	13
Square yards					16,210			140,030	55,701
Runaround							22		
Square yards							32,000		
Stake	1				5		55	18	38
Square yards	23				3,648		12,395	2,333	30.458
Lines—									
Hand				2			46		3
Hooks				4			50		6
Trawl							1,503		
Hooks							76,500		
Trot	1		1		10			6	3
Hooks	100		60		1,125			950	425
Pound nets							441		
Stop nets	1							9	
Square yards	66							3,935	
Fyke nets			24				2,147	103	29
Dip nets							35		
Scap nets			11					62	1
Drag nets							14		
Yards at mouth							40		
Push nets							28		
Otter trawls—Fish			1	1			82		
Yards at mouth		30		22			2,108		
Pots—									
Crab					23				
Eel	2				96		3,704	18	157
Lobster				1,250			5,895		40
Harpoons							17		1
Spears							56		
Dredges—									
Clam				1					
Yards at mouth				1					
Oyster							73		
Yards at mouth							94		
Scallop				2			1,049		
Yards at mouth				5			1,001		
Tongs							428		1
Rakes							408		
Forks				5			150		

CATCH: BY COUNTIES

Species	Albany		Bronx		Columbia		Dutchess		Greene	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	765	$54			9,500	$312	17,020	$1,138	26,690	$901
Carp	2,935	328			17,545	1,692	13,175	1,748	13,975	2,102
Catfish and bullheads	475	77			2,420	343	1,710	371	2,165	387
Eels					850	99	1,005	166		
Minnows	385	195							180	85
Pike or pickerel	240	44					100	20		
Shad					3,258	556	52,387	8,033	117	34
Striped bass							20	5		
Sturgeon	210	21					550	55		
Suckers	3,454	360			9,335	967	3,145	360	3,340	377
Sunfish					100	10	840	117	100	2
White perch							415	51		
Yellow perch	50	3			1,010	128	865	145	325	51
Clams: Hard, public			80	$30						
Total	8,514	1,082	80	30	44,018	4,107	91,232	12,209	46,892	3,939

Fisheries of New York, 1929—Continued

CATCH: BY COUNTIES

Species	Kings		Nassau		New York		Orange	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							2, 360	$169
Bluefish	238, 480	$21, 489	76, 380	$6, 573	174, 240	$18, 470		
Butterfish			1, 700	114	1, 255	88		
Carp							18, 540	2, 613
Catfish and bullheads							685	165
Cod	1, 255, 625	50, 897	376, 920	15, 540	469, 006	13, 322		
Croaker	340, 000	13, 600						
Eels	16, 100	2, 415	49, 890	8, 184			1, 705	411
Flounders	966, 800	44, 567	98, 100	5, 235	677, 590	26, 974		
Haddock	1, 130, 000	42, 980			4, 573, 774	143, 480		
Hake	77, 050	1, 570	940	23	7, 104	116		
Halibut	2, 200	360			3, 088	615		
Mackerel			89, 850	2, 690	355, 425	22, 030		
Menhaden	33, 600	168						
Minnows							2, 135	640
Mummichog	30, 400	4, 000	21, 800	2, 178				
Pollock					1, 124	16		
Rosefish					150	3		
Scup or porgy	668, 600	10, 595						
Sea bass	116, 300	8, 672	65, 940	3, 222	1, 350	141		
Shad							12, 141	2, 789
Silversides	1, 000	60	17, 570	2, 645				
Skates	1, 500	20	600	3				
Squeteagues	21, 000	525	21, 585	1, 773				
Striped bass			8, 500	2, 125			205	51
Suckers							12, 145	1, 697
Sunfish							30	5
Swordfish	3, 100	558			173, 544	27, 161		
Tautog	24, 500	2, 660			550	60		
Tilefish	445, 060	25, 716			2, 198, 500	89, 642		
Tomcod							500	40
White perch							965	119
Whiting	500	30						
Wolffish					1, 458	37		
Crabs:								
Hard			1, 665	105				
Rock			770	96				
Soft			2, 400	900				
Lobsters	392, 800	94, 935	66, 985	22, 944				
Shrimp	25, 000	1, 000	1, 070	258				
Clams:								
Hard, public	4, 800	900	187, 480	89, 290				
Hard, private			1, 000	375				
Razor			2, 800	689				
Soft	20, 810	4, 162	97, 900	24, 674				
Surf	130, 120	10, 949	10, 200	2, 425				
Conchs	23, 580	2, 200						
Mussels, sea			100, 600	5, 030				
Oysters:								
Market, public			21	6				
Market, private			886, 200	227, 488	1, 331, 687	273, 617		
Seed, private			140, 000	15, 000	13, 748	1, 964		
Scallops:								
Bay			3, 150	924				
Sea	1, 188, 588	235, 404	162, 900	38, 010	93, 600	18, 700		
Bloodworms	36, 055	37, 858	17, 081	20, 840				
Sandworms	36, 060	37, 863	3, 698	3, 788				
Total	7, 229, 628	656, 153	2, 515, 695	503, 147	10, 077, 193	636, 436	51, 411	8, 699

Species	Putnam		Queens		Rensselaer		Richmond		Rockland	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			250	$2	5, 765	$250			1, 065	$55
Carp	60	$12			6, 685	941			1, 685	205
Catfish and bullheads					1, 580	304			90	10
Cod							2, 725	$124		
Eels	120	17			255	62			7, 055	998
Flounders			75, 000	2, 500			31, 975	1, 599		
Minnows					30	15				
Mummichog							1, 500	300		
Pike or pickerel					50	12				
Shad			900	72	130	30			6, 754	1, 521
Striped bass									1, 050	297
Suckers	300	45			1, 105	132			635	64
Sunfish					10	2				
White perch					250	25			1, 935	271
Yellow perch					170	28				
Crabs: Hard							3, 067	137	3, 320	415
Lobsters							21, 000	5, 740		
Clams: Surf							9, 736	1, 217		
Conchs							27, 558	2, 036		
Sandworms							300	300		
Total	480	74	76, 150	2, 574	16, 030	1, 781	97, 861	11, 453	23, 589	3, 836

Fisheries of New York, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Saratoga		Suffolk		Ulster		Westchester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore			52, 500	$1, 005				
Alewives			756, 360	9, 160	31, 585	$1, 565	1, 570	$77
Bluefish			349, 734	35, 128				
Bonito			149, 759	9, 133				
Butterfish			601, 817	52, 607				
Carp	2, 000	$240	30, 400	4, 655	42, 775	7, 179	5, 930	823
Catfish and bullheads	400	40			2, 820	618	730	111
Cod			742, 541	28, 847			13, 200	540
Cunner			1, 200	72				
Eels			531, 790	71, 019	1, 545	266	13, 680	1, 405
Flounders			5, 200, 366	195, 519				
Grayfish			2, 500	50				
Haddock			97, 096	4, 806			550	22
Hake			11, 428	453			140	6
Herring, sea			14, 640	327				
King whiting or "kingfish"			4, 158	594				
Mackerel			252, 225	10, 974				
Menhaden			4, 731, 400	27, 195				
Minnows			168, 000	4, 800	335	135		
Mummichog			28, 650	3, 313				
Pike or pickerel							45	6
Pollock			65, 033	1, 771				
Scup or porgy			469, 798	26, 563				
Sea bass			94, 690	10, 391				
Sea robin			23, 208	645				
Shad			2, 946	609	69, 739	10, 365	16, 192	3, 043
Sharks			1, 000	20				
Silversides			204, 845	8, 363				
Skates			27, 051	728				
Smelt			7, 700	2, 182	130	21	1, 000	92
Spot			2, 700	216				
Squeteagues			606, 017	55, 295				
Striped bass			145, 172	26, 826			1, 220	320
Sturgeon							2, 145	456
Suckers	1, 000	100			7, 971	1, 161	8, 250	1, 179
Sunfish					520	68		
Swordfish			144, 490	6, 352			3, 000	400
Tautog			47, 682	2, 631				
Tomcod			141, 530	6, 223			350	33
Tuna or "horse mackerel"			810	97				
Whitebait			92, 900	6, 745				
White perch			12, 800	2, 620	865	82	6, 255	634
Whiting			450, 000	11, 360				
Yellow perch			200	10	960	121		
Crabs:								
Hard			105, 434	5, 087				
Soft			750	156				
Lobsters			164, 276	49, 470			2, 000	500
Shrimp			79, 510	9, 260				
Squid			425, 830	19, 870				
Clams:								
Hard, public			707, 840	336, 679			32	12
Hard, private			35, 000	7, 560				
Soft			467, 700	102, 353				
Surf			54, 560	13, 690				
Mussels, sea			65, 000	3, 250				
Oysters:								
Market, public			291, 627	93, 085				
Market, private			6, 682, 804	1, 571, 546				
Seed, public			216, 020	28, 650				
Seed, private			357, 000	53, 000				
Scallops:								
Bay			616, 476	177, 467				
Sea			165, 222	42, 080				
Bloodworms			21, 120	25, 766				
Sandworms			18, 152	16, 262				
Total	3, 400	380	26, 741, 457	3, 184, 475	159, 245	21, 581	76, 289	9, 659

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 55 persons in New York engaged primarily in transporting fishery products by means of vessels. In this trade 19 motor vessels, having a combined capacity of 300 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 204 wholesale establishments in New York engaged primarily in handling fresh and frozen products or in handling, but not manufacturing, prepared fishery products. These establishments employed 1,984 persons, who received $4,107,117 in salaries and wages. New York County alone accounted for 146 of these establishments.

Manufacturing.—There were 27 establishments in New York in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 330 persons, who received $520,960 in salaries and wages. The products manufactured, consisting principally of smoked fish, were valued at $5,458,479. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, "Fishery Industries of the United States, 1929."

Industries related to the fisheries of New York, 1929

TRANSPORTING

Items	Number
Persons engaged on transporting vessels	55
Transporting vessels, motor:	
5 to 10 tons	11
11 to 20 tons	1
21 to 30 tons	4
31 to 40 tons	3
Total vessels	19
Total net tonnage	300

WHOLESALE

Items	Albany County	Bronx and Orange Counties	Dutchess and Ulster Counties	Kings County	Nassau County	New York County	Suffolk County	Total
Establishments	3	4	3	14	11	146	23	204
Persons engaged:								
Proprietors	3	6	3	14	13	227	20	286
Salaried employees		7			6	365	17	395
Wage earners	5	29	2	6	46	972	243	1,303
Paid to salaried employees		$47,800			$9,600	$1,679,918	$50,488	$1,787,806
Paid to wage earners	$8,500	55,700	$2,000	$8,200	34,900	1,965,664	244,347	2,319,311
Total salaries and wages	8,500	103,500	2,000	8,200	44,500	3,645,582	294,835	4,107,117

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	27	Smoked:		
Persons engaged:		Butterfish pounds	420,624	$111,970
Proprietors	38	Carp do	524,583	205,842
Salaried employees	67	Ciscoes [2] do	2,185,251	714,596
Wage earners	225	Finnan haddie do	1,143,100	135,855
		Haddock fillets do	111,000	27,750
Paid to salaried employees	$199,856	Herring do	141,855	24,734
Paid to wage earners	321,104	Mackerel do	106,753	18,927
		Salmon do	3,480,129	1,329,209
Total salaries and wages	520,960	Salmon trout do	26,860	8,365
		Sturgeon do	1,453,005	1,343,032
		Other products do	91,840	27,783
		Canned, miscellaneous products—standard cases [3]	9,260	158,989
		By-products [4]		1,351,427
		Grand total		5,458,479

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[1] Includes the production of one firm whose activities were principally in the wholesale trade.

[2] Includes chubs, cisco, and tullibee.

[3] A standard case contains forty-eight 1-pound cans.

[4] Includes menhaden and fresh-water mussel-shell products ,and fish meal from ground fish

NEW JERSEY

The fisheries and industries related to the fisheries of New Jersey in 1929 employed 7,635 persons. This is 27 per cent more than the number employed in these fisheries during 1926, which is the most recent year for which comparable data are available. Of the total number of persons, 6,009 were fishermen, 222 were employed on transporting vessels and boats, 1,223 in the wholesale trade, and 181 in manufacturing industries.

The total catch amounted to 110,001,064 pounds, valued at $8,730,624. This is an increase of 50 per cent in quantity and 40 per cent in value, as compared with the catch and its value in 1926. Of the total value of the catch, that of oysters accounted for 66 per cent; clams, 6 per cent; and butterfish, 4 per cent. Of the total weight of the catch, that of oysters accounted for 40 per cent; squeteagues or "sea trout," 8 per cent; scup or porgy, 7 per cent; and menhaden, 6 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in New Jersey during 1929 was taken by 6,009 fishermen, who used 287 motor vessels, 79 sailing vessels, 2,086 motor and other small fishing boats, and 21 major types of gear. The vessels had a combined capacity of 6,442 net tons. The fisheries accounting for the greatest number of persons were the oyster-dredge fishery employing 2,733 fishermen, and the fishery with tongs employing 932 fishermen.

CATCH BY GEAR

Three types of gear accounted for 78 per cent of the fishery products taken in the marine fisheries of New Jersey during 1929. Listed in order of their importance, they were: Dredges, which accounted for 39 per cent of the total catch; pound nets, 28 per cent; and purse seines, 11 per cent. The catch by dredges was principally oysters; that by pound nets, principally whiting, squeteagues, butterfish, king crabs, scup, and menhaden; and that by purse seines was principally scup, menhaden, and squeteagues.

OPERATING UNITS BY COUNTIES

Cumberland County led in the number of persons fishing, accounting for 49 per cent of the total. Cape May County followed, with 16 per cent. Other counties employing a considerable number of fishermen were Ocean, Monmouth, and Atlantic. Cumberland County also was foremost in the number of vessels fishing, accounting for 68 per cent of the total. Cape May County followed with 17 per cent. Cape May County led in the number of motor and other small fishing boats, accounting for 25 per cent of the total, and Atlantic County followed, with 19 per cent.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of 14 counties in New Jersey during 1929. Ranked according to value, the fisheries of Cumberland County were most important, accounting for 41 per cent of the total catch and 65 per cent of the total value of the catch. Cape May County followed, with 26 per cent of the catch and 12 per cent of the value. Other important counties, listed in order of their importance with respect to the value of the catch, were Ocean, Monmouth, and Atlantic.

Fisheries of New Jersey, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines		Haul seines	Gill nets				Lines	
	Menhaden	Other		Anchor	Drift	Runaround	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	42	125			12			66	32
On boats and shore—									
Regular		11	85	9	217	62	16	175	188
Casual			214	12	167	13	41	117	65
Total	42	136	299	21	396	75	57	358	285
Vessels:									
Motor—									
5 to 10 tons		2			3			5	3
11 to 20 tons		6			1			9	7
21 to 30 tons		5							
31 to 40 tons	2								
Total	2	13			4			14	10
Net tonnage	75	231			38			163	112
Boats:									
Motor		2	18	14	141	37	12	146	119
Other			107	16	73		34	26	18
Accessory boats	4	28			5			22	16
Apparatus:									
Number	2	15	126	181	722	37	339	570	268
Length, yards	585	6, 230	13, 695						
Square yards				34, 760	920, 355	164, 200	66, 728		
Hooks, baits, or snoods								7, 340	364, 800

Items	Lines—Continued			Pound nets	Weirs	Stop nets	Fyke nets	Dip nets	Cast nets
	Troll	Trot with baits or snoods	Trot with hooks						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	10			316					
On boats and shore—									
Regular	120	3	5	184	4	44	37	5	
Casual	55	3	4	25	9	59	63	29	8
Total	185	6	9	525	13	103	100	34	8
Vessels:									
Motor—									
5 to 10 tons				47					
11 to 20 tons	2								
Total	2			47					
Net tonnage	32			290					
Boats:									
Motor	123	4	6	30	7	13	25	1	
Other			1	38	7	52	64	23	4
Accessory boats				6					
Apparatus:									
Number	478	4	7	181	10	52	1, 707	32	4
Square yards						125, 916			
Hooks, baits, or snoods	478	4, 050	2, 600						

Fisheries of New Jersey, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Bag nets	Drag nets	Otter trawls		Pots		Spears	Dredges	
			Fish	Shrimp	Eel	Lobster		Clam	Crab
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	150	15	--------	--------	--------	55	4
On boats and shore—									
Regular	12	--------	67	6	34	226	35	8	--------
Casual	16	3	9	--------	34	11	25	--------	--------
Total	28	3	226	21	68	237	60	63	4
Vessels:									
Motor—									
5 to 10 tons	--------	--------	17	2	--------	--------	--------	2	1
11 to 20 tons	--------	--------	16	2	--------	--------	--------	4	--------
21 to 30 tons	--------	--------	1	--------	--------	--------	--------	--------	--------
31 to 40 tons	--------	--------	2	--------	--------	--------	--------	--------	--------
41 to 50 tons	--------	--------	1	--------	--------	--------	--------	--------	--------
71 to 80 tons	--------	--------	1	--------	--------	--------	--------	--------	--------
Total	--------	--------	38	4	--------	--------	--------	6	1
Net tonnage	--------	--------	568	48	--------	--------	--------	73	6
Sail—									
21 to 30 tons	--------	--------	--------	--------	--------	--------	--------	1	--------
Total	--------	--------	--------	--------	--------	--------	--------	1	--------
Net tonnage	--------	--------	--------	--------	--------	--------	--------	21	--------
Boats:									
Motor	--------	2	32	2	23	128	7	4	--------
Other	12	--------	--------	--------	44	--------	28	--------	--------
Apparatus:									
Number	31	2	86	6	2, 803	27, 933	60	18	2
Yards at mouth	360	1	2, 062	128	--------	--------	--------	25	8

Items	Dredges—Continued		Tongs	Rakes	Forks	Hoes	Gaffs	By hand	Total, exclusive of duplication
	Oyster	Scallop							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2, 697	4	--------	4	--------	--------	--------	--------	3, 334
On boats and shore—									
Regular	32	--------	471	392	--------	51	10	37	1, 405
Casual	4	--------	461	228	6	14	36	64	1, 270
Total	2, 733	4	932	624	6	65	46	101	6, 009
Vessels:									
Motor—									
5 to 10 tons	40	1	--------	1	--------	--------	--------	--------	112
11 to 20 tons	94	--------	--------	1	--------	--------	--------	--------	124
21 to 30 tons	23	--------	--------	--------	--------	--------	--------	--------	28
31 to 40 tons	8	--------	--------	--------	--------	--------	--------	--------	11
41 to 50 tons	4	--------	--------	--------	--------	--------	--------	--------	5
51 to 60 tons	4	--------	--------	--------	--------	--------	--------	--------	4
61 to 70 tons	1	--------	--------	--------	--------	--------	--------	--------	1
71 to 80 tons	1	--------	--------	--------	--------	--------	--------	--------	2
Total	175	1	--------	2	--------	--------	--------	--------	287
Net tonnage	3, 087	6	--------	25	--------	--------	--------	--------	4, 338
Sail—									
5 to 10 tons	19	--------	--------	--------	--------	--------	--------	--------	19
11 to 20 tons	21	--------	--------	--------	--------	--------	--------	--------	21
21 to 30 tons	15	--------	--------	--------	--------	--------	--------	--------	15
31 to 40 tons	8	--------	--------	--------	--------	--------	--------	--------	8
41 to 50 tons	5	--------	--------	--------	--------	--------	--------	--------	5
51 to 60 tons	4	--------	--------	--------	--------	--------	--------	--------	4
61 to 70 tons	5	--------	--------	--------	--------	--------	--------	--------	5
71 to 80 tons	1	--------	--------	--------	--------	--------	--------	--------	1
91 to 100 tons	1	--------	--------	--------	--------	--------	--------	--------	1
Total	79	--------	--------	--------	--------	--------	--------	--------	79
Net tonnage	2, 104	--------	--------	--------	--------	--------	--------	--------	2, 104
Total vessels	--------	--------	--------	--------	--------	--------	--------	--------	366
Total net tonnage	--------	--------	--------	--------	--------	--------	--------	--------	6, 442
Boats:									
Motor	22	--------	435	384	--------	14	--------	1	1, 117
Other	--------	--------	453	219	--------	34	--------	69	969
Accessory boats	--------	--------	--------	--------	--------	--------	--------	--------	76
Apparatus:									
Number	536	3	915	574	6	54	46	12	--------
Yards at mouth	631	6	--------	--------	--------	--------	--------	--------	--------

Fisheries of New Jersey, 1929—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Anchor	
	Menhaden		Other					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	-----	-----	-----	-----	108,682	$2,807	-----	-----
Bluefish	-----	-----	751,000	$72,125	2,325	403	17,670	$2,294
Bonito	-----	-----	40,200	2,295	-----	-----	-----	-----
Butterfish	-----	-----	19,300	1,284	200	10	-----	-----
Carp	-----	-----	-----	-----	61,825	10,902	-----	-----
Catfish and bullheads	-----	-----	-----	-----	40,588	3,391	-----	-----
Cod	-----	-----	245,830	3,630	-----	-----	-----	-----
Croaker	-----	-----	704,600	16,738	11,918	897	-----	-----
Drum: Red or redfish	-----	-----	-----	-----	400	10	-----	-----
Eels	-----	-----	-----	-----	23,450	3,090	-----	-----
Flounders	-----	-----	7,000	317	30,940	3,218	-----	-----
King whiting or "kingfish"	-----	-----	200	2	1,140	142	-----	-----
Mackerel	-----	-----	34,000	1,150	-----	-----	-----	-----
Menhaden	3,689,100	$13,398	499,030	4,314	-----	-----	-----	-----
Mullet	-----	-----	-----	-----	7,330	435	-----	-----
Scup	-----	-----	3,853,200	74,780	400	10	-----	-----
Sea bass	-----	-----	143,600	6,789	-----	-----	-----	-----
Shad	-----	-----	-----	-----	50,483	13,758	-----	-----
Spot	-----	-----	5,200	206	5,545	346	700	21
Squeteagues	-----	-----	2,125,200	48,530	25,213	2,331	9,200	725
Striped bass	-----	-----	-----	-----	24,559	4,295	1,300	375
Suckers	-----	-----	-----	-----	57,441	6,523	-----	-----
White perch	-----	-----	-----	-----	29,493	4,329	8,467	1,550
Whiting	-----	-----	6,000	65	-----	-----	-----	-----
Yellow perch	-----	-----	-----	-----	6,398	910	-----	-----
Crabs:								
Hard	-----	-----	-----	-----	100	8	-----	-----
Soft	-----	-----	-----	-----	1,024	509	-----	-----
Total	3,689,100	13,398	8,434,360	232,225	489,454	58,324	37,337	4,965

Species	Gill nets						Lines, hand	
	Drift		Runaround		Stake			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,560	$113	-----	-----	3,596	$31	-----	-----
Bluefish	193,706	17,345	140,918	$13,810	3,160	440	613,310	$52,567
Bonito	4,553	227	3,330	200	-----	-----	8,200	425
Butterfish	39,669	2,824	5,475	500	75	5	833	81
Carp	500	70	-----	-----	-----	-----	290	43
Catfish and bullheads	-----	-----	-----	-----	75	6	225	40
Cod	-----	-----	-----	-----	-----	-----	337,050	11,580
Croaker	342,592	14,343	6,667	250	404	27	72,132	6,031
Drum:								
Black	3,600	36	-----	-----	-----	-----	-----	-----
Red or redfish	6,600	66	-----	-----	-----	-----	200	10
Eels	-----	-----	-----	-----	-----	-----	5,850	585
Flounders	533	35	1,250	100	91	6	27,052	2,097
Groupers	-----	-----	-----	-----	-----	-----	6,150	285
Hake	400	8	-----	-----	-----	-----	11,058	306
Jewfish	-----	-----	-----	-----	-----	-----	2,000	100
King whiting or "kingfish"	2,785	240	110	11	-----	-----	3,269	334
Mackerel	676,985	34,864	-----	-----	-----	-----	17,550	1,250
Pigfish	-----	-----	-----	-----	-----	-----	2,000	100
Scup	4,100	190	1,667	50	-----	-----	85,807	3,159
Sea bass	200	20	1,670	100	-----	-----	497,360	32,512
Shad	230,745	45,899	-----	-----	41,408	5,507	-----	-----
Sharks	3,000	120	1,125	45	-----	-----	25	2
Snapper, red	-----	-----	-----	-----	-----	-----	18,200	5,570
Spanish mackerel	-----	-----	-----	-----	-----	-----	500	30
Spot	165,858	6,959	14,400	807	500	40	8,000	395
Squeteagues	531,615	27,263	131,250	9,390	8,535	716	164,459	12,415
Striped bass	1,000	215	-----	-----	2,728	632	467	70
Sturgeon	2,585	707	-----	-----	-----	-----	-----	-----
Tautog	-----	-----	-----	-----	-----	-----	20,050	815
Tomcod	-----	-----	-----	-----	-----	-----	300	20
Tuna	-----	-----	-----	-----	-----	-----	23,600	1,243
Wahoo	-----	-----	-----	-----	-----	-----	2,000	100
White perch	300	35	-----	-----	19,181	2,757	350	35
Yellow perch	-----	-----	-----	-----	1,500	225	-----	-----
Crabs: Hard	700	175	-----	-----	-----	-----	-----	-----
Total	2,214,586	151,754	307,862	25,263	81,253	10,392	1,928,370	132,210

Fisheries of New Jersey, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Trawl		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			823, 745	$70, 494				
Bonito			133, 710	7, 484				
Catfish and bullheads							1, 300	$158
Cod	4, 177, 811	$95, 154						
Dolphin			100	5				
Eels	11	1						
Flounders	2, 000	200						
Hake	1, 450	66						
Sharks	300	4						
Skates	9, 600	200						
Spanish mackerel			4, 550	490				
Tuna			58, 285	5, 050				
Crabs:								
Hard	20, 000	600			68, 525	$2, 095	21, 614	875
Soft					415	78	1, 600	600
Total	4, 211, 172	96, 225	1, 020, 390	83, 523	68, 940	2, 173	24, 514	1, 633

Species	Pound nets		Weirs		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	23, 321	$1, 121						
Alewives	133, 376	1, 679						
Bluefish	413, 633	36, 870						
Bonito	572, 662	37, 936						
Butterfish	4, 942, 072	316, 038						
Carp					116, 791	$19, 089	625	$92
Catfish and bullheads					2, 850	272	37, 304	3, 615
Cod	494, 938	13, 798						
Croaker	283, 014	9, 953						
Cusk	12, 430	268						
Drum:								
Black	21, 900	438						
Red or redfish	16, 200	324						
Eels	11, 509	2, 637					29, 553	4, 317
Flounders	283, 392	20, 215					171, 800	9, 748
Goosefish	3, 000	90						
Grayfish	36, 105	502						
Hake	524, 848	10, 815						
Herring, sea	41, 274	872						
Hickory shad	2, 450	48						
King whiting or "kingfish"	30, 529	3, 299						
Mackerel	316, 346	15, 597						
Menhaden	2, 138, 989	11, 682						
Pilotfish	3, 700	136						
Pollock	32, 623	849						
Pompano	150	60						
Scup	2, 423, 024	62, 997						
Sea bass	629, 984	33, 015						
Sea robin	40, 100	839						
Shad	19, 780	2, 844						
Sharks	27, 539	556						
Sheepshead	500	25						
Skates	46, 221	828						
Spanish mackerel	72, 743	9, 192						
Spot	51, 893	1, 617						
Squeteagues	6, 124, 188	262, 863					100	8
Striped bass	3, 659	633					2, 182	587
Sturgeon	4, 226	1, 217						
Suckers					12, 191	1, 388	508	61
Tautog	16, 090	611						
Thimble-eyed mackerel	405, 342	7, 312						
Tomcod	4, 000	80						
Tuna	30, 909	1, 923						
White perch	3, 775	389					23, 300	2, 952
Whiting	6, 192, 891	114, 061						
Yellow perch							31, 915	4, 540
Crabs:								
Hard	3, 270	180						
King	4, 196, 000	9, 506	1, 496, 000	$3,931				
Lobsters	15, 000	4, 500						
Squid	476, 329	16, 317						
Turtles	250	4			725	56	2, 000	220
Total	31,126,174	1, 016, 736	1, 496, 000	3, 931	132, 557	20, 805	299, 287	26, 140

Fisheries of New Jersey, 1929—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Cast nets		Bag nets		Drag nets		Otter trawls, fish	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish									110	$10
Butterfish									5, 500	251
Carp			2, 224	$400						
Catfish and bullheads					3, 800	$380				
Cod									741, 415	19, 419
Croaker									756, 400	24, 688
Drum: Red or redfish									3, 200	22
Flounders					1, 194	140			2, 343, 265	126, 431
Hake									600	17
King whiting or "kingfish"									4, 875	192
Scup									1, 485, 400	41, 225
Sea bass									770, 500	38, 839
Sharks									535	4
Skates									7, 900	76
Spot									11, 800	201
Squeteagues									98, 900	3, 387
Striped bass					4, 694	1, 010				
Sturgeon									1, 640	442
Tautog									450	17
White perch					8, 499	1, 125				
Yellow perch					2, 333	350				
Crabs:										
Hard	14, 164	$1, 896								
Soft	3, 112	1, 310								
Lobsters									8, 035	1, 598
Shrimp							3, 200	$800		
Conchs									1, 314	140
Total	17, 276	3, 206	2, 224	400	20, 520	3, 005	3, 200	800	6, 241, 839	256, 959

Species	Otter trawls, shrimp		Pots				Spears		Dredges, clam	
			Eel		Lobster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			139, 688	$14,931	1, 150	$105	52, 112	$5, 181		
Flounders			6, 200	496						
King whiting or "kingfish"	9, 500	$190								
Sea bass					903, 800	45, 414				
Tautog					1, 200	64				
Lobsters					742, 532	192, 784				
Shrimp	445, 300	20, 192								
Clams:										
Hard, public									9, 600	$3, 900
Hard, private									12, 800	6, 000
Surf or skimmers									44, 000	7, 075
Total	454, 800	20, 382	145, 888	15, 427	1, 648, 682	238, 367	52, 112	5, 181	66, 400	16, 975

Species	Dredges						Tongs	
	Crab		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs: Hard	40, 330	$1, 810					12, 700	$794
Clams:								
Hard, public			264	$100			622, 020	226, 094
Hard, private			6, 664	2, 100			33, 550	12, 484
Mussels, sea							11, 750	816
Oysters:								
Market, public			325, 500	61, 650			146, 623	28, 370
Market, private			14, 736, 030	3, 167, 050			288, 432	63, 483
Seed, public			27, 849, 200	2, 378, 550			516, 285	37, 709
Seed, private			35, 000	3, 000			129, 151	11, 409
Scallops, sea					56, 700	$15, 750		
Total	40, 330	1, 810	42, 952, 658	5, 612, 450	56, 700	15, 750	1, 760, 511	381, 159

Fisheries of New Jersey, 1929—Continued

CATCH: BY GEAR—Continued

Species	Rakes		Forks		Hoes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs: King									16,000	$36
Clams:										
Hard, public	602,636	$220,051							53,056	16,358
Hard, private	14,208	5,391								
Soft, public	81,060	14,756	10,000	$7,000	138,750	$20,937				
Conchs	13,320	1,000								
Mussels, sea									7,000	1,000
Oysters:										
Market, public									4,438	1,245
Market, private	16,089	3,493							7,931	1,850
Seed, public									84	5
Terrapin									2,946	3,057
Turtles							9,050	$877		
Total	727,313	226,691	10,000	7,000	138,750	20,937	9,050	877	91,455	23,551

OPERATING UNITS: BY COUNTIES

Items	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	70		3		323	2,682	
On boats and shore—							
Regular	216		54	6	293	127	4
Casual	192	20	79	7	333	145	26
Total	478	20	136	13	949	2,954	30
Vessels:							
Motor—							
5 to 10 tons	3				37	37	
11 to 20 tons	11		1		17	92	
21 to 30 tons	1				4	23	
31 to 40 tons					2	8	
41 to 50 tons					1	4	
51 to 60 tons						4	
61 to 70 tons						1	
71 to 80 tons					1	1	
Total	15		1		62	170	
Net tonnage	186		11		797	3,041	
Sail—							
5 to 10 tons						19	
11 to 20 tons						21	
21 to 30 tons						15	
31 to 40 tons						8	
41 to 50 tons						5	
51 to 60 tons						4	
61 to 70 tons						5	
71 to 80 tons						1	
91 to 100 tons						1	
Total						79	
Net tonnage						2,104	
Total vessels	15		1		62	249	
Total net tonnage	186		11		797	5,145	
Boats:							
Motor	202	5	63	1	240	71	7
Other	204	6	47	5	274	169	18
Accessory boats	17				47	7	
Apparatus:							
Purse seines—							
Menhaden						1	
Length, yards						400	
Other	3				12		
Length, yards	1,200				5,030		
Haul seines	20		25	5	14	14	5
Length, yards	1,480		2,580	410	820	1,590	390

Fisheries of New Jersey, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Atlantic	Bergen	Burlington	Cumden	Cape May	Cumberland	Gloucester
Apparatus—Continued.							
Gill nets—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Drift	87	--------	29	1	371	100	14
Square yards	49, 000	--------	27, 745	6, 600	211, 692	192, 710	11, 700
Runaround	--------	--------	--------	--------	3	--------	--------
Square yards	--------	--------	--------	--------	2, 700	--------	--------
Stake	18	5	12	--------	4	53	--------
Square yards	1, 400	9, 100	2, 160	--------	800	7, 628	--------
Lines—							
Hand	48	--------	--------	--------	318	152	--------
Hooks	92	--------	--------	--------	6, 958	215	--------
Trawl	35	--------	--------	--------	186	1	--------
Hooks	113, 100	--------	--------	--------	158, 300	700	--------
Troll	21	--------	--------	--------	281	--------	--------
Hooks	21	--------	--------	--------	281	--------	--------
Trot with baits or snoods	--------	--------	--------	--------	--------	3	--------
Baits or snoods	--------	--------	--------	--------	--------	3, 550	--------
Trot with hooks	--------	--------	--------	--------	--------	6	--------
Hooks	--------	--------	--------	--------	--------	1, 600	--------
Pound nets	2	--------	--------	--------	77	--------	--------
Weirs	--------	--------	--------	--------	8	2	--------
Stop nets	--------	--------	5	1	--------	13	7
Square yards	--------	--------	24, 300	1, 200	--------	34, 000	19, 200
Fyke nets	20	--------	147	--------	99	166	80
Dip nets	12	--------	--------	--------	5	5	--------
Cast nets	--------	--------	--------	1	--------	--------	1
Bag nets	7	--------	24	--------	--------	--------	--------
Yards at mouth	84	--------	276	--------	--------	--------	--------
Otter trawls—							
Fish	23	--------	--------	--------	61	--------	--------
Yards at mouth	690	--------	--------	--------	1, 332	--------	--------
Shrimp	--------	--------	--------	--------	6	--------	--------
Yards at mouth	--------	--------	--------	--------	128	--------	--------
Pots—							
Eel	--------	190	--------	--------	161	69	--------
Lobster	--------	--------	--------	--------	480	--------	--------
Spears	20	--------	--------	--------	1	--------	--------
Dredges—							
Clam	--------	--------	--------	--------	4	8	--------
Yards at mouth	--------	--------	--------	--------	4	9	--------
Oyster	--------	--------	2	--------	--------	502	--------
Yards at mouth	--------	--------	3	--------	--------	600	--------
Tongs	247	--------	63	--------	162	222	--------
Rakes	176	--------	60	--------	121	--------	--------
Forks	6	--------	--------	--------	--------	--------	--------
Gaffs	--------	--------	--------	--------	--------	14	--------

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	--------	40	216	--------
On boats and shore—							
Regular	1	--------	--------	3	429	242	30
Casual	--------	30	37	5	115	165	116
Total	1	30	37	8	584	623	146
Vessels:							
Motor—							
5 to 10 tons	--------	--------	--------	--------	5	30	--------
11 to 20 tons	--------	--------	--------	--------	2	1	--------
31 to 40 tons	--------	--------	--------	--------	1	--------	--------
Total	--------	--------	--------	--------	8	31	--------
Net tonnage	--------	--------	--------	--------	111	192	--------
Total vessels	--------	--------	--------	--------	8	31	--------
Total net tonnage	--------	--------	--------	--------	111	192	--------
Boats:							
Motor	1	--------	1	6	201	276	43
Other	--------	10	9	--------	75	104	48
Accessory boats	--------	--------	--------	--------	5	--------	--------

Fisheries of New Jersey, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Apparatus:							
Purse seines—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Menhaden					1		
Length, yards					185		
Haul seines		6	6			8	23
Length, yards		1, 250	1, 610			1, 450	2, 115
Gill nets—							
Anchor					3	178	
Square yards					8, 000	26, 760	
Drift			3		75		42
Square yards			1, 575		171, 800		247, 533
Runaround				2	12	20	
Square yards				4, 200	51, 900	105, 400	
Stake				6		241	
Square yards				1, 680		43, 960	
Lines—							
Hand					45	4	3
Hooks					63	6	6
Trawl					25	21	
Hooks					49, 300	43, 400	
Troll					132	44	
Hooks					132	44	
Trot with baits or snoods							1
Baits or snoods							500
Trot with hooks							1
Hooks							1, 000
Pound nets					49	53	
Stop nets							26
Square yards							47, 216
Fyke nets					22	649	524
Dip nets					7	1	2
Cast nets							2
Drag nets						2	
Yards at mouth						1	
Otter trawls—							
Fish					1	1	
Yards at mouth					20	20	
Pots—							
Eel	50		100	35	743	1, 455	
Lobster				160	18, 593	8, 700	
Spears					31	8	
Dredges—							
Clam				2	4		
Yards at mouth				6	6		
Crab					2		
Yards at mouth					8		
Oyster						32	
Yards at mouth						28	
Scallop					3		
Yards at mouth					6		
Tongs					1	220	
Rakes					70	147	
Hoes					54		
Gaffs							32

CATCH: BY COUNTIES

Species	Atlantic		Bergen		Burlington		Camden	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	9, 000	$270			3, 362	$95	960	$50
Bluefish	156, 270	15, 390						
Bonito	3, 000	180						
Butterfish	15, 150	1, 285						
Carp					16, 050	2, 842	14, 789	2, 662
Catfish and bullheads	12, 000	1, 200			7, 817	815	506	58
Cod	1, 595, 000	23, 460						
Croaker	104, 550	4, 940						
Eels	34, 500	3, 050	23, 000	$2, 300	4, 918	653		
Flounders	828, 300	55, 857			2, 221	290		
Herring, sea	20, 150	400						
King whiting or "kingfish"	3, 490	520						
Mackerel	213, 900	11, 095						
Scup or porgy	871, 300	17, 710						
Sea bass	357, 500	19, 551						

Fisheries of New Jersey, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Atlantic		Bergen		Burlington		Camden	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Shad	-----	-----	38, 850	$4, 882	17, 681	$4, 347	6, 206	$1, 554
Skates	500	$10	-----	-----	-----	-----	-----	-----
Spot	13, 380	465	-----	-----	-----	-----	-----	-----
Squeteagues	492, 660	15, 795	-----	-----	-----	-----	-----	-----
Striped bass	11, 245	1, 785	-----	-----	7, 733	1, 991	-----	-----
Suckers	1, 000	75	-----	-----	50, 324	5, 769	227	25
Tautog	2, 400	120	-----	-----	-----	-----	-----	-----
Tomcod	300	20	-----	-----	-----	-----	-----	-----
Tuna	5, 000	260	-----	-----	-----	-----	-----	-----
White perch	21, 500	3, 225	-----	-----	9, 633	1, 205	-----	-----
Whiting	10, 500	210	-----	-----	-----	-----	-----	-----
Yellow perch	4, 900	685	-----	-----	2, 998	450	-----	-----
Crabs: Hard	5, 000	750	-----	-----	-----	-----	-----	-----
Lobsters	6, 650	1, 280	-----	-----	-----	-----	-----	-----
Clams:								
Hard, public	419, 110	155, 232	-----	-----	74, 000	26, 750	-----	-----
Hard, private	25, 336	9, 950	-----	-----	13, 064	4, 900	-----	-----
Soft, public	15, 000	10, 000	-----	-----	-----	-----	-----	-----
Conchs	13, 320	1, 000	-----	-----	-----	-----	-----	-----
Mussels, sea	7, 000	1, 000	-----	-----	-----	-----	-----	-----
Oysters:								
Market, public	12, 950	2, 810	-----	-----	-----	-----	-----	-----
Market, private	220, 910	48, 800	-----	-----	94, 605	20, 275	-----	-----
Seed, public	2, 450	260	-----	-----	48, 419	4, 151	-----	-----
Seed, private	78, 870	7, 100	-----	-----	85, 281	7, 309	-----	-----
Total	5, 594, 091	415, 740	61, 850	7, 182	438, 106	81, 842	22, 688	4, 349

Species	Cape May		Cumberland		Gloucester		Hudson		Hunterdon	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	1, 996	$80	-----	-----	-----	-----	-----	-----	-----	-----
Alewives	17, 976	423	26, 796	$840	720	$27	-----	-----	1, 200	$37
Bluefish	1, 760, 682	152, 149	96, 384	13, 846	-----	-----	-----	-----	-----	-----
Bonito	135, 891	8, 010	-----	-----	-----	-----	-----	-----	-----	-----
Butterfish	1, 612, 594	90, 233	4, 033	325	-----	-----	-----	-----	-----	-----
Carp	-----	-----	55, 601	9, 198	19, 280	3, 335	-----	-----	750	90
Catfish and bullheads	-----	-----	20, 068	2, 103	7, 986	718	-----	-----	325	32
Cod	3, 062, 954	80, 111	9, 200	830	-----	-----	-----	-----	-----	-----
Croaker	1, 589, 866	48, 541	364, 861	15, 997	-----	-----	-----	-----	-----	-----
Dolphin	100	5	-----	-----	-----	-----	-----	-----	-----	-----
Drum:										
Black	-----	-----	3, 600	36	-----	-----	-----	-----	-----	-----
Red or redfish	3, 400	32	6, 600	66	-----	-----	-----	-----	-----	-----
Eels	36, 646	7, 206	12, 047	1, 352	2, 684	310	11, 670	$1, 152	-----	-----
Flounders	1, 619, 506	78, 747	7, 591	641	-----	-----	-----	-----	-----	-----
Groupers	6, 150	285	-----	-----	-----	-----	-----	-----	-----	-----
Hake	18, 608	519	-----	-----	-----	-----	-----	-----	-----	-----
Jewfish	2, 000	100	-----	-----	-----	-----	-----	-----	-----	-----
King whiting or "kingfish"	36, 125	2, 331	1, 956	195	-----	-----	-----	-----	-----	-----
Mackerel	394, 302	20, 685	-----	-----	-----	-----	-----	-----	-----	-----
Menhaden	529, 332	4, 642	660, 600	3, 303	-----	-----	-----	-----	-----	-----
Mullet	7, 330	435	-----	-----	-----	-----	-----	-----	-----	-----
Pigfish	-----	-----	2, 000	100	-----	-----	-----	-----	-----	-----
Pilotfish	200	6	-----	-----	-----	-----	-----	-----	-----	-----
Pollock	1, 288	38	-----	-----	-----	-----	-----	-----	-----	-----
Scup or porgy	5, 309, 752	120, 412	8, 025	360	-----	-----	-----	-----	-----	-----
Sea bass	1, 414, 068	77, 782	40, 000	3, 200	-----	-----	-----	-----	-----	-----
Shad	2, 527	278	75, 461	12, 543	4, 586	945	-----	-----	18, 050	5, 800
Sharks	7, 204	221	25	2	-----	-----	-----	-----	-----	-----
Skates	31, 947	445	-----	-----	-----	-----	-----	-----	-----	-----
Snapper, red	18, 200	5, 570	-----	-----	-----	-----	-----	-----	-----	-----
Spanish mackerel	34, 248	3, 450	-----	-----	-----	-----	-----	-----	-----	-----
Spot	64, 178	3, 134	154, 556	6, 030	-----	-----	-----	-----	-----	-----
Squeteagues	4, 161, 459	135, 043	443, 684	27, 109	-----	-----	-----	-----	-----	-----
Striped bass	516	75	2, 992	590	-----	-----	-----	-----	-----	-----
Sturgeon	1, 640	442	865	135	-----	-----	-----	-----	-----	-----
Suckers	-----	-----	4, 108	748	1, 273	110	-----	-----	4, 100	410
Tautog	1, 750	73	18, 050	725	-----	-----	-----	-----	-----	-----
Thimble-eyed mackerel	67, 384	1, 152	-----	-----	-----	-----	-----	-----	-----	-----
Tuna	49, 320	4, 681	21, 500	1, 075	-----	-----	-----	-----	-----	-----
Wahoo	2, 000	100	-----	-----	-----	-----	-----	-----	-----	-----
White perch	575	54	4, 165	557	-----	-----	-----	-----	-----	-----
Whiting	62, 775	832	-----	-----	-----	-----	-----	-----	-----	-----

Fisheries of New Jersey, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Cape May		Cumberland		Gloucester		Hudson		Hunterdon	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:										
Hard	18, 570	$1, 338	108, 295	$3, 560						
King	5, 564, 000	13, 005	144, 000	468						
Soft	724	359	915	158						
Lobsters	1, 390	316								
Shrimp	445, 300	20, 192								
Squid	118, 610	2, 896								
Clams:										
Hard, public	387, 158	120, 211	264	100						
Hard, private	1, 000	438	12, 800	6, 000						
Soft, public	6, 940	1, 388								
Surf or skimmers	44, 000	7, 075								
Conchs	1, 314	140								
Mussels, sea	11, 750	816								
Oysters:										
Market, public	10, 522	2, 750	444, 689	83, 405						
Market, private	9, 100	2, 150	14, 226, 594	3, 055, 926						
Seed, public	2, 765	250	28, 311, 935	2, 411, 603						
Terrapin	1, 800	1, 840	1, 146	1, 217						
Turtles	1, 750	174	3, 633	377						
Total	28, 693, 182	1, 023, 660	45, 299, 039	5, 664, 720	36, 529	$5, 445	11, 670	$1, 152	24, 425	$6, 369

Species	Mercer		Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore					16, 675	$797	4, 650	$244		
Alewives	7, 200	$140			43, 818	478	131, 582	1, 978	5, 600	$292
Bluefish			3, 750	$375	627, 773	54, 555	314, 718	30, 043		
Bonito					318, 181	20, 525	305, 583	19, 852		
Butterfish			1, 200	95	578, 764	55, 672	2, 801, 383	173, 383		
Carp	2, 250	270							73, 535	12, 199
Catfish and bullheads	575	57					8, 937	715	27, 928	2, 164
Cod					641, 090	19, 856	688, 800	19, 324		
Croaker					15, 104	453	102, 846	2, 966	500	30
Cusk					2, 500	50	9, 930	218		
Drum:										
Black					17, 000	340	4, 900	98		
Red or redfish					12, 000	240	4, 600	94		
Eels	1, 500	225	1, 500	150	66, 099	8, 020	64, 850	5, 928	3, 909	501
Flounders					121, 122	9, 481	295, 477	17, 912	500	75
Goosefish							3, 000	90		
Grayfish					34, 705	474	1, 400	28		
Hake					279, 081	6, 077	240, 667	4, 616		
Herring, sea					16, 624	337	4, 500	135		
Hickory shad					2, 450	48				
King whiting or "kingfish"					2, 866	395	7, 971	969		
Mackerel					311, 273	13, 151	125, 406	7, 930		
Menhaden					5, 060, 334	20, 551	76, 853	898		
Pilotfish					2, 500	100	1, 000	30		
Pollock					26, 145	707	5, 190	104		
Pompano					150	60				
Scup or porgy					566, 919	14, 543	1, 097, 602	29, 386		
Sea bass					117, 880	5, 728	1, 017, 666	50, 428		
Sea robin					12, 500	287	27, 600	552		
Shad	27, 128	6, 881			8, 921	1, 651	10, 432	1, 545	132, 574	27, 582
Sharks					4, 495	90	20, 800	418		
Sheepshead					500	25				
Skates					8, 500	187	22, 774	462		
Spanish mackerel					150	12	43, 395	6, 250		
Spot			5, 300	159	14, 917	454	11, 565	350		
Squeteagues			21, 250	1, 275	1, 077, 692	74, 311	3, 020, 215	113, 930	1, 700	165
Striped bass					308	46	17, 795	3, 330		
Sturgeon					3, 092	843	1, 134	374	1, 720	572
Suckers	7, 500	740					1, 400	70	208	25
Tautog					12, 930	479	2, 660	110		
Thimble-eyed mackerel					240, 723	4, 115	97, 235	2, 045		
Tomcod							4, 000	80		
Tuna					19, 425	1, 179	17, 549	1, 021		
White perch					1, 500	125	55, 992	8, 006		
Whiting					3, 983, 957	82, 084	2, 141, 659	31, 000		
Yellow perch					1, 000	150	33, 248	4, 740		
Crabs:										
Hard					43, 474	2, 160	3, 000	375	3, 064	250
Soft					1, 032	450	1, 800	900	1, 680	630

Fisheries of New Jersey, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Mercer		Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Lobsters	-----	-----	1, 800	$585	719, 187	$186, 486	36, 540	$10, 215	-----	-----
Shrimp	-----	-----	-----	-----	-----	-----	3, 200	800	-----	-----
Squid	-----	-----	-----	-----	175, 709	6, 194	182, 010	7, 227	-----	-----
Clams:										
Hard, public	-----	-----	2, 400	1, 200	49, 968	20, 250	354, 676	124, 760	-----	-----
Hard, private	-----	-----	-----	-----	-----	-----	15, 022	4, 687	-----	-----
Soft, public	-----	-----	-----	-----	207, 870	31, 305	-----	-----	-----	-----
Oysters:										
Market, public	-----	-----	-----	-----	350	100	8, 050	2, 200	-----	-----
Market, private	-----	-----	-----	-----	-----	-----	497, 273	108, 725	-----	-----
Scallops, sea	-----	-----	-----	-----	56, 700	15, 750	-----	-----	-----	-----
Turtles	-----	-----	-----	-----	-----	-----	-----	-----	6, 725	$616
Total	46, 153	$8, 313	37, 200	3, 839	15, 525, 953	661, 371	13, 950, 535	801, 541	259, 643	45, 101

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 38 persons in New Jersey engaged primarily in transporting fishery products by means of vessels. In this trade 11 motor vessels having a combined capacity of 197 net tons were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 82 wholesale establishments in New Jersey engaged primarily in handling fresh and frozen products. These establishments employed 1,223 persons who received $536,058 in salaries and wages. Cumberland County alone accounted for 38 of these establishments.

Manufacturing.—There were 15 establishments in New Jersey in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 181 persons who received $127,943 in salaries and wages. The products manufactured, consisting of smoked fish, canned clam chowder, oyster-shell products, and menhaden and king crab products, were valued at $1,126,467. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Industries related to the fisheries of New Jersey, 1929

TRANSPORTING

Items	Number
Persons engaged:	
On transporting vessels	38
On transporting boats	184
Total	222
Transporting vessels:	
Motor—	
5 to 10 tons	5
11 to 20 tons	2
21 to 30 tons	3
41 to 50 tons	1
Total	11
Net tonnage	197
Transporting boats	221

Industries related to the fisheries of New Jersey, 1929—Continued

WHOLESALE

Items	Atlantic and Burlington Counties	Cape May County	Cumberland County	Monmouth County	Ocean County	Total
Establishments	10	15	38	5	14	82
Persons engaged:						
Proprietors	18	44	69	6	19	156
Salaried employees	3	7	31	1	5	47
Wage earners	23	30	911	25	31	1,020
Paid to salaried employees	$27,140	$73,800	$47,040	$4,500	$23,200	$175,680
Paid to wage earners	28,130	27,490	241,058	25,400	38,300	360,378
Total salaries and wages	55,270	101,290	288,098	29,900	61,500	536,058

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	15	Smoked:		
Persons engaged:		Butterfish, pounds	30,000	$9,250
Proprietors	19	Carp, do	78,000	35,100
Salaried employees	9	Ciscoe, do	200,000	67,500
Wage earners	153	Eels, do	42,500	16,800
		Herring, sea, do	23,000	3,520
Paid to salaried employees	$22,660	Salmon, do	505,000	202,000
Paid to wage earners	105,283	Sturgeon, do	39,000	38,900
		Whitefish, do	200,000	76,000
Total salaries and wages	127,943	Other fish, do	6,500	1,775
		By-products:		
		King crab scrap, tons	558	33,191
		Oyster-shell products:		
		Poultry food, do	8,073	77,283
		Lime, do	2,258	9,576
		Miscellaneous products [2]		555,572
		Total		1,126,467

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[1] Includes products prepared by one firm whose activities were principally in the wholesale trade.
[2] Includes canned clam chowder and menhaden products.

PENNSYLVANIA

The fisheries and industries related to the fisheries of Pennsylvania in 1929 employed 530 persons. This is 18 per cent less than the number employed in these fisheries during 1926, which is the most recent year for which comparable data are available. Of the total number of persons, 53 were fishermen, 356 were engaged in the wholesale trade, and 121 in manufacturing industries.

The total catch amounted to 41,904 pounds, valued at $9,388. This is a decrease of 94 per cent in quantity and 79 per cent in value, as compared with the catch and its value in 1926. Of the total catch, that of shad accounted for 52 per cent of the weight and 79 per cent of the value.

OPERATING UNITS BY GEAR

The catch of fishery products in Pennsylvania during 1929 was taken by 53 fishermen, who used 20 motor and other small fishing boats and 5 major types of gear. The haul-seine fishery accounted for 37 of these fishermen, and 11 of the small fishing boats.

CATCH BY GEAR

Two types of gear accounted for 92 per cent of the fishery products taken in the fisheries of Pennsylvania during 1929. Haul seines were the most important, accounting for 76 per cent of the total catch, and drift gill nets followed with 16 per cent. The catch by both haul seines and drift gill nets was principally shad.

OPERATING UNITS BY COUNTIES

Bucks County was foremost in the number of persons fishing, accounting for 74 per cent of the total. Delaware County followed with 17 per cent. Bucks County also accounted for 60 per cent of the motor and other small boats.

CATCH BY COUNTIES

Fishing was prosecuted in the waters of three counties in Pennsylvania during 1929. The fisheries of Bucks County were most important, accounting for 77 per cent of the total catch and 85 per cent of the total value of the catch. Delaware County followed with 14 per cent of the quantity and 9 per cent of the value.

Fisheries of Pennsylvania, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines	Gill nets, drift	Lines, hand	Stop nets	Fyke nets	Total, exclusive of duplication
Fishermen:						
On boats and shore—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	2					2
Casual	35	17	1	2	1	51
Total	37	17	1	2	1	53
Boats:						
Motor		5		1		5
Other	11	4	1		1	15
Apparatus:						
Number	11	10	1	1	30	
Length, yards	1,370					
Square yards		38,200		1,600		
Hooks, baits, or snoods			1			

CATCH: BY GEAR

Species	Haul seines		Gill nets, drift		Lines, hand		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3,000	$75	2,000	$104						
Carp	2,679	370					833	$100		
Catfish and bullheads	900	90							1,332	$150
Eels					1,330	$200				
Shad	17,297	6,312	4,583	1,118						
Suckers	7,950	869								
Total	31,826	7,716	6,583	1,222	1,330	200	833	100	1,332	150

Fisheries of Pennsylvania, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Bucks	Delaware	Philadelphia
Fishermen:			
On boats and shore—	*Number*	*Number*	*Number*
Regular	2		
Casual	37	9	5
Total	39	9	5
Boats:			
Motor		4	1
Other	12	1	2

Items	Bucks	Delaware	Philadelphia
	Number	*Number*	*Number*
Apparatus:			
Haul seines	10		1
Length, yards	1,270		100
Gill nets, drift	3	6	1
Square yards	2,700	34,600	900
Lines, hand			1
Hooks			1
Stop nets			1
Square yards			1,600
Fyke nets		30	

CATCH: BY COUNTIES

Species	Bucks		Delaware		Philadelphia	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3,000	$75	2,000	$104		
Carp	2,393	330			1,119	$140
Catfish and bullheads	900	90	1,332	150		
Eels					1,330	20
Shad	18,572	6,649	2,458	556	850	225
Suckers	7,450	819			500	50
Total	32,315	7,963	5,790	810	3,799	615

INDUSTRIES RELATED TO THE FISHERIES

Wholesale.—There were 44 establishments in Pennsylvania in 1929 engaged primarily in handling fresh and frozen products. These establishments employed 356 persons, who received $668,750 in salaries and wages. All of these establishments were located in Philadelphia.

Manufacturing.—There were nine establishments in Pennsylvania in 1929 engaged primarily in the manufacture of fishery products and by-products. They employed 121 persons, who received $188,772 in salaries and wages. The products manufactured, consisting principally of smoked fish and oyster-shell products, were valued at $1,171,135.

Industries related to the fisheries of Pennsylvania, 1929

WHOLESALE

Items	Number
Establishments	44
Persons engaged:	
Proprietors	66
Salaried employees	84
Wage earners	206
Paid to salaried employees	$386,310
Paid to wage earners	282,440
Total, salaries and wages	668,750

Fisheries of Pennsylvania, 1929—Continued

MANUFACTURING

Items	Number	Products	Quantity	Value
Establishments	9	Smoked fish pounds	3,390,875	$1,060,385
Persons engaged:		Oyster-shell products:		
Proprietors	18	Poultry food tons	6,226	62,260
Salaried employees	11	Lime do	1,880	8,630
Wage earners	92	Other products [1]		39,860
Paid to salaried employees	$62,660	Total		1,171,135
Paid to wage earners	126,112			
Total salaries and wages	188,772			

[1] Includes dried-fish scrap, "Bismark" herring, and spiced alewives.

DELAWARE

The fisheries and industries related to the fisheries of Delaware in 1929 employed 1,636 persons. This is 15 per cent less than the number employed in these fisheries during 1926, which is the most recent year for which comparable data are available. Of the total number of persons, 1,262 were fishermen, 7 were employed on transporting vessels, 184 in the wholesale trade, and 183 in manufacturing industries.

The total catch amounted to 33,470,479 pounds, valued at $335,981. This is an increase of 1 per cent in the catch but a decrease of 67 per cent in the value of the catch, as compared with the catch and its value in 1926. Of the total value of the catch, that of menhaden accounted for 33 per cent; oysters, 20 per cent; and squeteagues or "sea trout," 12 per cent. Of the total weight of the catch, that of menhaden accounted for 88 per cent, and oysters and squeteagues or "sea trout," each 3 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products along the coast of Delaware during 1929 was taken by 1,262 fishermen, who used 15 steam vessels, 15 motor vessels, 2 sailing vessels, 326 motor and other small fishing boats, and 15 major types of gear. The vessels had a combined capacity of 2,296 net tons. The fisheries accounting for the greatest number of persons were the purse-seine fishery employing 551 fishermen and the haul-seine fishery employing 322 fishermen.

CATCH BY GEAR

The catch of fishery products by purse seines in Delaware during 1929 accounted for 88 per cent of the total. The entire catch by purse seines was menhaden.

OPERATING UNITS BY COUNTIES

Of the three counties of Delaware, Sussex County accounted for 71 per cent of the total number of fishermen, 56 per cent of the total number of vessels, and 52 per cent of the motor and other small fishing boats. Kent County was next in importance, accounting for 21 per cent of the fishermen, 44 per cent of the fishing vessels, and 29 per cent of the small fishing boats.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of three counties in Delaware during 1929. Ranked according to value, the fisheries of Sussex County were the most important, accounting for 93 per cent of the total catch, and 62 per cent of the total value of the catch. Kent was next in importance, accounting for 6 per cent of the quantity and 30 per cent of the value.

Fisheries of Delaware, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines, menhaden	Haul seines	Gill nets			Lines			
			Drift	Run-around	Stake	Hand	Trawl	Trot with baits or snoods	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	551								
On boats and shore—									
Regular		60	46	9	4	9	4	5	2
Casual		262	90	31	34	5		15	2
Total	551	322	136	40	38	14	4	20	4
Vessels:									
Steam—									
41 to 50 tons	1								
81 to 90 tons	1								
101 to 110 tons	4								
111 to 120 tons	1								
121 to 130 tons	1								
161 to 170 tons	2								
171 to 180 tons	4								
181 to 190 tons	1								
Total	15								
Net tonnage	2,008								
Motor—									
61 to 70 tons	1								
Total	1								
Net tonnage	68								
Total vessels	16								
Total net tonnage	2,076								
Boats:									
Motor		18	46	12	4	4	1	6	2
Other		80	36	7	19	6	2	3	
Accessory boats	48								
Apparatus:									
Number	16	86	110	15	128	16	4	38	2
Length, yards	4,980	24,445							
Square yards			202,013	23,540	15,872				
Hooks, baits, or snoods						30	1,750	3,580	600

Items	Pound nets	Stop nets	Fyke nets	Dip nets	Cast nets	Pots		
						Crab	Eel	Lobster
Fishermen:								
On boats and shore—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	1	2	23	8	2		7	7
Casual	8	9	47	2	15	8	16	2
Total	9	11	70	10	17	8	23	9
Boats:								
Motor	3	3	14	1		1	5	6
Other	11	6	32	10	13	3	12	2
Apparatus:								
Number	11	14	504	10	13	51	566	200
Square yards		4,480						

Fisheries of Delaware, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Spears	Dredges		Tongs	Rakes	Gaffs	By hand	Total, exclusive of duplication
		Clams	Oyster					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		66	92					645
On boats and shore—								
Regular	2			37	6		1	123
Casual	14			63	2	7	23	494
Total	16	66	92	100	8	7	24	1, 262
Vessels:								
Steam—								
41 to 50 tons								1
81 to 90 tons								1
101 to 110 tons								4
111 to 120 tons								1
121 to 130 tons								1
161 to 170 tons								2
171 to 180 tons								4
181 to 190 tons								1
Total								15
Net tonnage								2, 008
Motor—								
5 to 10 tons		2	4					4
11 to 20 tons		6	6					7
21 to 30 tons		2	3					3
61 to 70 tons								1
Total		10	13					15
Net tonnage		149	175					254
Sail—								
11 to 20 tons		1	2					2
Net tonnage		17	34					34
Total vessels		11	15					32
Total net tonnage		166	209					2, 296
Boats:								
Motor				5	4		2	23
Other	16			76		1	11	248
Accessory boats								49
Apparatus:								
Number	16	22	30	140	6	7	1	
Yards at mouth		26	37					

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines, common		Gill nets					
					Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			98, 100	$1, 703	1, 000	$12			4, 400	$90
Bluefish			6, 575	582	20, 395	5, 365	3, 530	$405		
Butterfish			925	37	1, 000	100	135	20		
Carp			68, 597	8, 895	5, 300	887			5, 970	719
Catfish and bullheads			15, 952	1, 234	33	5			120	10
Cod					50	4				
Croakers			229, 700	5, 964	177, 200	6, 375	113, 165	2, 815		
Drum:										
Black			400	4			200	10		
Red			50	1			800	16		
Eels			550	65						
Flounders			8, 842	304			200	10		
Hickory shad			800	80						
King whiting or "kingfish"			1, 587	167			400	35		
Menhaden	29, 454, 120	$112, 311								
Mullet			200	25	13, 700	1, 360	2, 000	200		
Pike or pickerel			250	55						
Scup					1, 600	80				
Shad			18, 827	2, 785	72, 175	12, 022			2, 517	440
Spot			16, 829	958	2, 775	172	6, 625	315		
Squeteagues or "sea trout"			820, 192	30, 024	98, 025	5, 390	83, 225	3, 420		
Striped bass			4, 739	997	2, 325	661	400	80	1, 700	240
Sturgeon					10, 560	2, 610				
Suckers			1, 630	215						
White perch			46, 333	5, 624	5, 470	1, 183			4, 681	656
Yellow perch			3, 986	482	200	12			123	15
Crabs, hard			6, 100	147						
Total	29, 454, 120	112, 311	1, 351, 164	60, 348	411, 808	36, 238	210, 680	7, 326	19, 511	2, 170

Fisheries of Delaware, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines								Pound nets	
	Hand		Trawl		Trot with baits		Trot with hooks			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives									1,000	$5
Carp									1,665	300
Catfish and bullheads									3,280	320
Cod			13,330	$750			1,500	$80		
Croakers	2,300	$95								
Drum, red	1,400	70								
Eels	850	75							35	5
King whiting or "kingfish"	50	3								
Shad									40	5
Squeteagues or "sea trout"	15,100	745								
Tautog	3,500	140								
White perch									665	100
Yellow perch									665	100
Crabs:										
Hard					22,330	$1,810				
King									176,000	308
Total	23,200	1,128	13,330	750	22,330	1,810	1,500	80	183,350	1,143

Species	Stop nets		Fyke nets		Dip nets		Cast nets		Pots	
									Crab	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			17,200	$420						
Carp	10,050	$1,980	8,035	1,036	611	$100	5,360	$857		
Catfish and bullheads	456	38	3,925	430	75	6	350	28		
Eels			5,545	858						
Flounders			20,560	1,295						
Pike or pickerel			300	45						
Striped bass			1,290	235						
Suckers			100	8	50	4				
White perch	100	8	4,600	465						
Yellow perch	100	8	12,250	740						
Crabs:										
Hard			560	25					8,400	$570
Soft					16,800	3,600				
Turtles			10,675	688						
Total	10,706	2,034	85,040	6,245	17,536	3,710	5,710	885	8,400	570

Species	Pots—Continued				Spears		Dredges			
	Eel		Lobster				Clam		Oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					12,000	$960				
Eels	20,718	$2,413			3,600	600				
White perch					3,600	540				
Yellow perch					3,600	360				
Lobsters			12,600	$3,780						
Clams:										
Hard, public							15,752	$4,547		
Hard, private							43,200	16,000		
Oysters:										
Market, private									4,900	$925
Seed, public									785,435	40,659
Total	20,718	2,413	12,600	3,780	22,800	2,460	58,952	20,547	790,335	41,584

Species	Tongs		Rakes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, king							376,000	$658
Frogs							355	91
Clams: Hard, public	1,504	$750	1,056	$510				
Mussels							1,050	150
Oysters:								
Market, public	99,610	11,482						
Seed, public	264,950	14,650						
Turtles					2,164	$158		
Total	366,064	26,882	1,056	510	2,164	158	377,405	899

Fisheries of Delaware, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Kent	New Castle	Sussex
	Number	*Number*	*Number*
Fishermen:			
On vessels	86	----------	559
On boats and shore—			
Regular	33	14	76
Casual	148	81	265
Total	267	95	900
Vessels:			
Steam—			
41 to 50 tons	----------	----------	1
81 to 90 tons	----------	----------	1
101 to 110 tons	----------	----------	4
111 to 120 tons	----------	----------	1
121 to 130 tons	----------	----------	1
161 to 170 tons	----------	----------	2
171 to 180 tons	----------	----------	4
181 to 190 tons	----------	----------	1
Total	----------	----------	15
Net tonnage	----------	----------	2,008
Motor—			
5 to 10 tons	4	----------	1
11 to 20 tons	7	----------	----------
21 to 30 tons	1	----------	1
61 to 70 tons	----------	----------	1
Total	12	----------	3
Net tonnage	152	----------	102
Sail—			
11 to 20 tons	2	----------	----------
Net tonnage	34	----------	----------
Total vessels	14	----------	18
Total net tonnage	186	----------	2,110
Boats:			
Motor	18	28	46
Other	77	35	122
Accessory boats	1	----------	48
Apparatus:			
Purse seines, menhaden	----------	----------	16
Length, yards	----------	----------	4,980
Haul seines	18	18	50
Length, yards	6,600	3,165	14,680
Gill nets—			
Drift	13	30	67
Square yards	23,455	129,633	48,925
Runaround	5	----------	10
Square yards	7,565	----------	15,975
Stake	27	22	79
Square yards	3,072	4,490	8,310
Lines—			
Hand	----------	2	14
Hooks	----------	2	28
Trawl	----------	----------	4
Hooks	----------	----------	1,750
Trot with baits or snoods	35	3	----------
Baits or snoods	2,880	700	----------
Trot with hooks	2	----------	----------
Hooks	600	----------	----------
Pound nets	7	4	----------
Stop nets	----------	14	----------
Square yards	----------	4,480	----------
Fyke nets	128	237	139
Dip nets	----------	2	8
Cast nets	2	11	----------
Pots:			
Crab	36	15	----------
Eel	138	68	360
Lobster	----------	----------	200
Spears	----------	----------	16
Dredges:			
Clam	20	----------	2
Yards at mouth	23	----------	3
Oyster	26	----------	4
Yards at mouth	31	----------	6
Tongs	84	----------	56
Rakes	6	----------	----------
Gaffs	4	3	----------

Fisheries of Delaware, 1929—Continued

CATCH: BY COUNTIES

Species	Kent		New Castle		Sussex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,000	$30	2,500	$32	117,200	$2,168
Bluefish	1,663	285	----------	----------	28,837	6,067
Butterfish	135	20	----------	----------	1,925	137
Carp	7,385	1,425	58,028	9,980	52,175	4,329
Catfish and bullheads	1,025	125	14,501	1,241	8,665	705
Cod	1,550	84	----------	----------	13,330	750
Croakers	101,265	2,551	----------	----------	421,100	12,698
Drum:						
Black	600	14	----------	----------	----------	----------
Red	200	10	----------	----------	2,050	77
Eels	6,518	878	3,735	530	21,045	2,608
Flounders	4,942	135	----------	----------	24,660	1,474
Hickory shad	----------	----------	800	80	----------	----------
King whiting or "kingfish"	237	7	----------	----------	1,800	198
Menhaden	----------	----------	----------	----------	29,454,120	112,311
Mullet	----------	----------	----------	----------	15,900	1,585
Pike or pickerel	----------	----------	----------	----------	550	100
Scup	----------	----------	----------	----------	1,600	80
Shad	6,390	1,275	50,160	8,905	37,009	5,072
Spot	2,204	58	1,000	20	23,025	1,367
Squeteagues or "sea trout"	380,325	12,335	2,767	95	633,450	27,149
Striped bass	5,040	976	----------	----------	5,414	1,237
Sturgeon	----------	----------	10,560	2,610	----------	----------
Suckers	----------	----------	1,380	204	400	23
Tautog	----------	----------	----------	----------	3,500	140
White perch	10,357	1,598	1,542	193	53,550	6,785
Yellow perch	179	25	1,542	193	19,203	1,499
Crabs:						
Hard	18,730	1,460	12,000	920	6,660	172
King	552,000	966	----------	----------	----------	----------
Soft	----------	----------	----------	----------	16,800	3,600
Lobsters	----------	----------	----------	----------	12,600	3,780
Frogs	----------	----------	355	91	----------	----------
Clams:						
Hard, public	18,168	5,750	----------	----------	144	57
Hard, private	43,200	16,000	----------	----------	----------	----------
Mussels	1,050	150	----------	----------	----------	----------
Oysters:						
Market, public	19,110	2,282	----------	----------	80,500	9,200
Market, private	3,500	675	----------	----------	1,400	250
Seed, public	985,915	52,159	----------	----------	64,470	3,150
Turtles	4,339	335	8,000	461	500	50
Total	2,178,027	101,608	168,870	25,555	31,123,582	208,818

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were seven persons in Delaware engaged primarily in transporting fishery products by means of vessels. In this trade two motor vessels, having a combined capacity of 14 net tons, were operated. Both of these vessels were between the capacity ranges of 5 and 10 net tons.

Wholesale.—There were 15 establishments in Delaware engaged primarily in handling fresh and frozen products. These establishments employed 184 persons, who received $35,950 in salaries and wages.

Manufacturing.—There were five establishments in Delaware in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 183 persons, who received $53,550 in salaries and wages. The products manufactured, consisting of sturgeon caviar, menhaden products, and king crab scrap, were valued at $418,841. Detailed statistics of most of the production of by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Industries related to the fisheries of Delaware, 1929

TRANSPORTING

Items	Number
Persons engaged on transporting vessels	7
Transporting vessels:	
Motor—5 to 10 tons	2
Total net tonnage	14

WHOLESALE

Items	Kent	Newcastle	Sussex	Total
Establishments	3	6	6	15
Persons engaged:				
Proprietors	12	7	11	30
Wage earners	46	8	100	154
Paid to wage earners	$5,500	$7,000	$23,450	$35,950

MANUFACTURING

Items	Number	Products	Value
Establishments	5	Miscellaneous[1]	$418,841
Persons engaged:			
Proprietors	10		
Salaried employees	10		
Wage earners	163		
Paid to salaried employees	$20,700		
Paid to wage earners	32,850		
Total salaries and wages	53,550		

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[1] Includes sturgeon caviar, menhaden products, and king crab scrap.

HISTORICAL REVIEW

Thirteen general surveys have been made for statistics of the fisheries of the Middle Atlantic States during the 50 years from 1880 to 1929. The catch for 1880 amounted to 408,202,000 pounds, the largest on record. Since that time the catch has continued to decrease with the second smallest catch on record shown for 1929 when 190,773,00 pounds were taken. Comparative statistics for each of the more important species taken are shown in the following tables:

Fisheries of the Middle Atlantic States, 1880 to 1929

SUMMARY: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Year	New York		New Jersey		Pennsylvania		Delaware		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1880	329,453	4,226	65,151	3,176	1,680	277	11,918	998	408,202	8,677
1887	130,288	3,387	65,246	4,168	7,895	333	10,396	211	213,825	8,099
1888	192,513	3,466	61,115	4,199	12,901	344	10,226	209	276,755	8,218
1889	175,936	4,182	82,362	3,170	7,166	325	9,859	257	275,323	7,934
1890	192,471	4,602	88,730	3,447	7,849	328	10,054	267	299,104	8,644
1891	170,885	4,817	79,116	3,520	7,584	322	7,698	255	265,283	8,914
1892	(1)	(1)	73,267	3,646	6,324	284	7,195	251	(1)	(1)
1897	109,556	3,392	103,782	3,614	5,604	269	8,648	252	227,590	7,527
1898	210,497	3,545	90,297	3,564	(1)	(1)	(1)	(1)	(1)	(1)
1901	228,092	3,894	117,931	4,756	6,030	251	5,835	203	357,888	9,104
1904	277,650	6,231	90,108	3,385	2,046	167	5,608	260	375,412	10,043
1908	71,474	4,390	74,827	3,069	4,380	280	70,769	541	221,450	8,280
1921	210,377	4,987	96,937	5,983	595	45	25,023	652	332,932	11,667
1926	60,721	5,129	73,299	6,254	735	43	33,258	1,030	168,013	12,456
1929	47,259	5,062	110,001	8,731	42	9	33,471	336	190,773	14,138

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[1] Statistics not available.

Fisheries of the Middle Atlantic States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Bluefish					Bonito		
	New York	New Jersey	Pennsylvania	Delaware	Total	New York	New Jersey	Total
1880	3,000	3,635	30	46	6,711	--------	--------	--------
1887	2,853	4,789	30	(1)	(1)	21	(1)	(1)
1888	3,454	4,661	(1)	(1)	(1)	(1)	(1)	(1)
1889	5,027	8,565	(1)	(1)	(1)	3	178	181
1890	5,740	9,291	(1)	(1)	(1)	2	145	147
1891	5,507	7,228	(1)	(1)	(1)	2	150	152
1897	11,146	5,164	13	--------	16,323	43	359	402
1901	9,351	6,110	1	--------	15.462	195	1,459	1,654
1904	11,414	2,723	--------	--------	14,137	310	598	908
1908	3,191	1,850	8	--------	5,049	102	578	680
1921	1,083	2,243	1	1	3,328	256	1,503	1,759
1926	262	628	22	10	922	90	508	598
1929	839	2,960	--------	30	3,829	150	762	912

Year	Butterfish					Cod				
	New York	New Jersey	Pennsylvania	Delaware	Total	New York	New Jersey	Pennsylvania	Delaware	Total
1880	--------	--------	--------	--------	--------	3,580	1,667	(1)	(1)	(1)
1887	--------	--------	--------	--------	--------	3,455	788	30	(1)	(1)
1888	--------	--------	--------	--------	--------	3,195	726	21	(1)	(1)
1889	365	237	(1)	(1)	(1)	1,880	982	148	(1)	(1)
1890	423	239	(1)	(1)	(1)	1,939	730	142	(1)	(1)
1891	837	231	(1)	(1)	(1)	2,277	841	133	(1)	(1)
1897	729	217	--------	--------	946	2,116	3,482	--------	--------	5,598
1901	591	3,008	--------	--------	3,599	1,172	2,301	--------	1	3,474
1904	579	1,357	--------	--------	1,936	1,170	1,262	--------	1	2,433
1908	1,229	2,054	--------	--------	3,283	2,999	3,767	50	7	6,823
1921	630	2,863	--------	--------	3,493	668	687	--------	--------	1,355
1926	998	3,078	6	7	4,089	2,643	2,217	14	--------	4,874
1929	605	5,013	--------	2	5,620	2,860	5,997	--------	15	8,872

Year	Croaker					Scup or porgy				
	New York	New Jersey	Pennsylvania	Delaware	Total	New York	New Jersey	Pennsylvania	Delaware	Total
1889	--------	--------	--------	--------	--------	348	12	(1)	(1)	(1)
1890	--------	--------	--------	--------	--------	369	16	(1)	(1)	(1)
1891	--------	--------	--------	--------	--------	351	26	(1)	(1)	(1)
1897	(1)	281	--------	297	--------	746	758	29	--------	1,533
1901	(1)	226	6	29	261	804	607	23	--------	1,434
1904	(1)	342	--------	25	367	1,494	1,055	--------	--------	2,549
1908	8	790	14	79	891	1,294	1,196	11	--------	2,501
1921	(1)	3,816	2	419	--------	1,297	4,116	142	--------	5,555
1926	4	2,456	1	897	3,358	928	2,452	122	2	3,504
1929	340	2,178	--------	522	3,040	1,138	7,854	--------	2	8,994

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[1] Statistics not available.

Fisheries of the Middle Atlantic States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Sea bass					Shad				
	New York	New Jersey	Pennsylvania	Delaware	Total	New York	New Jersey	Pennsylvania	Delaware	Total
1880	--------	--------	--------	--------	--------	2, 734	750	559	1, 050	5, 093
1887	319	819	666	4	1, 808	3, 586	6, 495	1, 424	1, 270	12, 775
1888	309	816	738	2	1, 865	3, 446	6, 523	1, 387	1, 389	12, 745
1889	558	2, 968	615	(1)	(1)	4, 332	10, 424	2, 753	1, 498	19, 007
1890	751	3, 560	803	(1)	(1)	3, 777	10, 623	2, 898	1, 797	19, 095
1891	679	3, 732	947	(1)	(1)	3, 045	10, 225	2, 693	1, 500	17, 463
1897	354	2, 132	900	2	3, 388	1, 884	13, 001	2, 007	1, 621	18, 513
1901	232	1, 495	687	1	2, 415	3, 432	14, 031	2, 893	1, 368	21, 814
1904	320	2, 572	--------	1	2, 893	498	4, 338	836	951	6, 623
1908	723	3, 161	860	--------	4, 744	360	3, 004	593	870	4, 827
1921	149	1, 378	135	--------	1, 662	116	168	19	87	390
1926	231	2, 096	43	--------	2, 370	231	553	21	147	952
1929	278	2, 947	--------	--------	3, 225	164	342	22	94	622

Year	Squeteague or weakfish					Striped bass				
	New York	New Jersey	Pennsylvania	Delaware	Total	New York	New Jersey	Pennsylvania	Delaware	Total
1880	4, 000	4, 430	15	2, 619	11, 064	--------	--------	--------	--------	--------
1887	1, 505	2, 377	--------	2, 377	6, 259	115	615	15	116	861
1888	1, 435	2, 845	--------	2, 452	6, 732	98	739	59	116	1, 012
1889	2, 802	4, 716	(1)	3, 212	(1)	212	306	24	110	652
1890	--------	--------	--------	--------	--------	208	328	23	107	666
1891	--------	--------	--------	--------	--------	205	298	25	95	623
1897	2, 562	8, 679	--------	1, 441	12, 682	116	287	10	129	542
1901	2, 347	11, 973	4	722	15, 046	72	354	13	48	487
1904	6, 340	10, 699	--------	773	17, 812	53	66	6	40	165
1908	11, 151	11, 814	12	2, 590	25, 567	45	53	7	53	158
1921	1, 921	11, 652	240	886	14, 699	95	70	--------	5	170
1926	1, 073	7, 173	383	772	9, 401	87	64	--------	46	197
1929	649	9, 219	--------	1, 016	10, 884	156	41	--------	10	207

Year	Lobsters				Crabs, blue			
	New York	New Jersey	Delaware	Total	New York	New Jersey	Delaware	Total
1880	135	157	(1)	292	1, 625	1, 470	85	3, 180
1887	114	102	39	255	983	1, 489	205	2, 677
1888	248	182	39	469	1, 287	1, 431	152	2, 870
1889	124	188	10	322	531	354	124	1, 009
1890	151	185	7	343	519	418	108	1, 045
1891	165	166	8	339	529	520	86	1, 135
1897	381	99	5	485	413	795	169	1, 377
1901	183	66	3	252	832	1, 138	151	2, 121
1904	230	141	3	374	826	350	135	1, 311
1908	423	115	6	544	602	345	199	1, 146
1921	1, 037	398	11	1, 446	483	136	5	624
1926	455	643	21	1, 119	3	68	323	394
1929	647	765	13	1, 425	117	187	54	358

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[1] Statistics not available.

Fisheries of the Middle Atlantic States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Oysters					Hard clams				Scallops		
	New York	New Jersey	Pennsylvania	Delaware	Total	New York	New Jersey	Delaware	Total	New York	New Jersey	Total
1880	7,303	13,825	(2)	2,100	(3)	2,795	3,132	6	5,933	(3)	(3)	(3)
1887	13,903	18,337	1,566	275	34,081	2,674	[4] 4,225	12	6,911	317	-------	317
1888	13,308	17,672	1,592	293	32,865	2,594	[4] 4,385	13	6,992	200	-------	200
1889	14,628	15,164	1,337	1,034	32,163	4,161	3,414	20	7,595	457	-------	457
1890	16,456	15,813	1,249	1,180	34,698	4,202	3,396	22	7,620	596	-------	596
1891	18,277	16,115	1,184	1,097	36,673	4,525	3,454	22	8,001	313	-------	313
1892	(3)	18,204	927	1,227	(3)	(3)	2,991	21	(3)	(3)	-------	(3)
1897	14,887	21,035	1,862	1,146	38,930	[4] 2,219	[4] 5,475	7	7,701	886	72	958
1901	16,189	25,264	585	1,212	43,250	1,478	4,246	8	5,732	1,110	114	1,224
1904	23,305	14,946	831	1,691	40,773	1,336	2,166	10	3,512	893	-------	893
1908	17,244	18,105	1,938	2,434	39,721	809	2,184	7	3,000	650	-------	650
1911	27,425	19,447	(5)	3,455	50,327	-------	-------	-------	-------	-------	-------	-------
1921	9,500	22,998	(5)	4,316	36,814	770	782	4	1,556	1,236	1	1,237
1926	7,564	25,949	(5)	5,999	39,512	587	637	53	1,277	1,368	47	1,415
1929	9,919	44,055	(5)	1,155	55,129	936	1,355	62	2,353	2,230	57	2,287

[2] Value $187,500.
[3] Data not available.
[4] Includes hard and soft clams.
[5] From 1880 to 1908, inclusive, oysters taken from Delaware and New Jersey beds by vessels owned in Pennsylvania, were credited to the latter State, but since 1908 they have been credited to the States in which the beds are located.

VESSEL FISHERIES AT NEW YORK CITY AND GROTON, CONN.[3]

During 1930 fishing vessels of 5 net tons capacity and over landed 57,255,000 pounds of fishery products at New York City and Groton. Conn. This is 24 per cent less than the landings at these ports in 1929 and also is less than the landings in 1928. However, the landings of 1930 were considerably greater than for any other year since 1921. There were decreases in practically every species of importance landed at these ports. The landings of haddock amounted to 36,540,000 pounds, accounting for 64 per cent of the total; those of flounders amounted to 6,951,000 pounds, or 12 per cent of the total; cod, 3,981,000 pounds, or 7 per cent of the total; mackerel, 3,602,000 pounds, or 6 per cent of the total; and tilefish, 2,907,000 pounds, or 5 per cent of the total. The total landings of all other species amounted to about 6 per cent of the total. The only important species which showed an increase in landings over 1929 were mackerel and tilefish.

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[3] Statistics of the landings of fish by vessels of 5 net tons and over at New York City have been collected during the past few years by J. H. Matthews, executive secretary, United States Fisheries Association. These have been forwarded to the bureau, where they have been compiled. Since November, 1927, statistics of the landings of fish by vessels at Groton, Conn., have been included with those for fish landed at New York City, because at that time one of the firms packing fish at New York City moved its plant to Groton, thus requiring its trawlers to unload at Groton. By including the landings at Groton, the figures since November, 1927, are comparable with those for previous years. The statistics at both ports are combined to avoid disclosing individual enterprise.

Landings of fish at New York City and Groton, Conn., 1922 to 1930 [1]

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Bluefish	Cod	Flounders	Haddock	Hake	Halibut	Mackerel	Pollock
1922	2,032	936	5,550	4,332	----------	----------	1,371	----------
1923	1,735	1,394	9,614	10,792	----------	----------	1,251	----------
1924	111	1,686	13,281	[2] 14,449	----------	----------	3,047	----------
1925	51	1,647	17,912	14,771	----------	73	2,670	----------
1926	74	1,282	12,793	17,908	----------	54	5,038	----------
1927	71	1,426	10,076	30,403	----------	40	4,939	----------
1928	143	2,970	9,979	49,990	215	59	3,850	183
1929	476	4,458	7,374	55,937	140	60	3,286	120
1930	665	3,981	6,951	36,540	----------	----------	3,602	----------

Year	Porgies or scup and sea bass	Sturgeon	Swordfish	Tilefish	Squeteague or weakfish	Miscellaneous [3]	Total
1922	1,583	20	2	1,153	59	3,716	20,754
1923	2,553	----------	----------	1,364	272	4,857	33,832
1924	808	----------	----------	1,262	332	45	35,021
1925	1,318	----------	----------	1,015	1,099	66	40,622
1926	540	----------	----------	1,975	228	42	39,934
1927	459	----------	----------	2,777	171	410	50,772
1928	622	----------	22	2,365	16	763	71,177
1929	686	----------	----------	2,458	84	246	75,325
1930	509	----------	----------	2,907	108	1,992	57,255

[1] Includes landings of fish at Groton, Conn., beginning with November, 1927.

[2] Includes the landings of some mixed fish.

[3] Where landings are not shown for certain species, it is probable that they are included under "Miscellaneous."

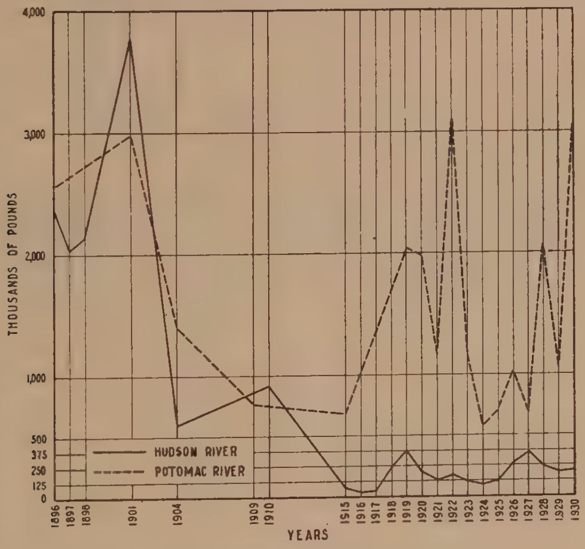

FIGURE 17.—Catch of shad in the Hudson and Potomac Rivers for various years, 1896 to 1930

SHAD FISHERY OF THE HUDSON RIVER

Shad fishing on the Hudson River in 1930 was followed by 243 fishermen who used 21 motor boats, 109 other boats, 105 drift gill nets that had a total area of 324,681 square yards, and 21 stake gill nets that had an area of 33,030 square yards. The catch amounted to 61,441 shad, having a weight of 206,504 pounds, and a value to the fishermen of $33,372. This is an increase of 9 per cent in both number of shad and their value as compared with the production in 1929. The price per pound received by the fishermen in 1930 varied but little from that obtained during the previous year.

The catch of shad taken by drift gill nets accounted for 72 per cent of the total and that by stake gill nets accounted for 27 per cent. Approximately 1 per cent of the catch was made by gear which was fished primarily for other species.

With the exception of some fishing with stake gill nets from one town in New Jersey, the fishing was prosecuted from points in New York.

Shad fishery of the Hudson River, 1930

Items	New York			New Jersey			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Fishermen	225	--------	--------	18	--------	--------	243	--------	--------
Boats:									
Motor	18	--------	--------	3	--------	--------	21	--------	--------
Other	102	--------	--------	7	--------	--------	109	--------	--------
Gill nets:									
Drift	105	--------	--------	--------	--------	--------	105	--------	--------
Square yards	324, 681	--------	--------	--------	--------	--------	324, 681	--------	--------
Stake	14	--------	--------	7	--------	--------	21	--------	--------
Square yards	16, 670	--------	--------	16, 360	--------	--------	33, 030	--------	--------
Shad caught:									
With drift gill nets	44, 817	148, 372	$24, 168	--------	--------	--------	44, 817	148, 372	$24, 168
With stake gill nets	3, 979	15, 298	3, 232	12, 200	41, 500	$5, 684	16, 179	56, 798	8, 916
Incidentally	445	1, 334	288	--------	--------	--------	445	1, 334	288
Total	49, 241	165, 004	27, 688	12, 200	41, 500	5, 684	61, 441	206, 504	33, 372

Catch of shad in the Hudson River for various years, 1896 to 1930

Year	New York			New Jersey			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
1896	420, 098	1, 681, 371	$58, 921	168, 800	675, 595	$24, 316	588, 898	2, 356, 966	$83, 237
1897	404, 877	1, 506, 142	49, 353	115, 200	529, 920	17, 934	520, 077	2, 036, 062	67, 287
1898	410, 395	1, 534, 877	50, 875	129, 855	606, 423	18, 510	540, 250	2, 141, 300	69, 385
1901	829, 612	3, 202, 302	100, 762	144, 315	577, 260	21, 647	973, 927	3, 779, 562	122, 409
1904	100, 624	402, 496	28, 896	57, 657	201, 800	17, 758	158, 281	604, 296	46, 654
1910 [1]	126, 534	506, 136	51, 715	101, 720	406, 880	49, 109	228, 254	913, 016	100, 824
1915	11, 606	48, 564	5, 969	4, 249	20, 104	2, 674	15, 855	68, 668	8, 643
1916	7, 787	32, 923	4, 540	1, 500	7, 250	925	9, 287	40, 173	5, 465
1917	10, 615	38, 344	5, 810	1, 400	5, 040	720	12, 015	43, 384	6, 530
1918	63, 404	220, 602	44, 784	3, 999	14, 000	3, 400	67, 403	234, 602	48, 184
1919	76, 501	301, 306	60, 690	13, 800	73, 668	23, 034	90, 301	374, 974	83, 724
1920	39, 692	157, 715	43, 882	9, 623	42, 129	12, 427	49, 315	199, 844	56, 309
1921	28, 948	104, 883	24, 329	6, 500	25, 920	6, 294	35, 448	130, 803	30, 623
1922	36, 111	128, 324	27, 451	12, 225	46, 862	12, 255	48, 336	175, 186	39, 706
1923	28, 636	97, 863	22, 644	6, 450	23, 865	6, 000	35, 086	121, 728	28, 644
1924	22, 814	72, 519	17, 619	5, 980	21, 850	5, 485	28, 794	94, 369	23, 104
1925	34, 568	110, 359	24, 030	4, 300	13, 975	2, 400	38, 868	124, 334	26, 430
1926	73, 312	219, 183	47, 175	11, 150	46, 237	6, 300	84, 462	265, 420	53, 475
1927	89, 984	299, 693	56, 950	20, 300	58, 362	6, 700	110, 284	358, 055	63, 650
1928	61, 079	194, 181	32, 689	17, 950	52, 050	10, 460	79, 029	246, 231	43, 149
1929	45, 980	157, 895	25, 801	10, 500	38, 850	4, 882	56, 480	196, 745	30, 683
1930	49, 241	165, 004	27, 688	12, 200	41, 500	5, 684	61, 441	206, 504	33, 372

[1] Includes catch in lower New York Bay, Raritan Bay, and tributaries, but this was inconsiderable.

FISHERIES OF THE CHESAPEAKE BAY STATES

In the years for which there are records the value of the catch of fishery products in the Chesapeake Bay States (Maryland and Virginia) during 1929 was exceeded only in 1920 and 1925. These fisheries gave employment to 18,470 fishermen or 26 per cent less than in 1925, the most recent year for which records are available prior to 1929. Of the total number of fishermen employed during 1929, 2,586 regular fishermen were engaged on vessels, and 7,063 regular and 8,821 casual fishermen were employed in the shore and boat fisheries. Their catch amounted to 274,673,437 pounds, valued at $11,580,628. This is a decrease of 18 per cent in the catch and 17 per cent in the value of the catch as compared with the quantity and its value for 1925. Of the total catch in 1929, 169,064,502 pounds, valued at $4,633,493, were fish; and 105,608,935 pounds, valued at $6,947,135, were shellfish and miscellaneous products.

Based on the value to the fishermen, oysters with a production of 43,113,598 pounds of meats, valued at $4,890,786, were the most important product. Shad were second with a production of 9,525,686 pounds, valued at $1,602,105. Other products of importance were: Blue crabs, 60,177,504 pounds, valued at $1,467,898; menhaden, 99,229,250 pounds, valued at $823,020; squeteagues or "sea trout," 11,388,751 pounds, valued at $487,096; croaker, 16,620,836 pounds, valued at $413,199; butterfish, 6,443,502 pounds, valued at $383,218; and hard clams, 986,491 pounds of meats, valued at $374,160. Other products were valued individually at less than $300,000.

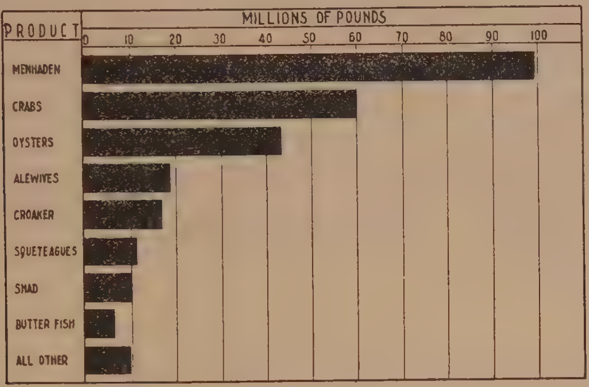

FIGURE 18.—Yield of principal fishery products in the Chesapeake Bay States, 1929

The industries related to the fisheries of the Chesapeake Bay States gave employment to 8,868 persons; of whom 855 were engaged in transporting fishery products, 6,498 were in the wholesale trade and received $2,727,048 in salaries and wages, 1,459 were in the manufacturing industry and received $599,327 in salaries and wages, and 56 were fishermen who prepared fishery products and are duplicated in the total number of fishermen employed as shown above. There were 450 establishments in the wholesale trade handling primary products and 58 establishments in the manufacturing industry. The latter manufactured products, valued at $2,887,647, consisting principally of menhaden products, oyster-shell products, and canned alewife products. In addition, the fishermen prepared fishery products valued at $13,624. Most of these products were salt fish prepared from alewives and eels.

Fisheries of the Chesapeake Bay States, 1929

SUMMARY OF CATCH

Products	Maryland		Virginia		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	17, 233, 388	$990, 671	151, 831, 114	$3, 642, 822	169, 064, 502	$4, 633, 493
Shellfish, etc	46, 154, 220	3, 304, 288	59, 454, 715	3, 642, 847	105, 608, 935	6, 947, 135
Total	63, 387, 608	4, 294, 959	211, 285, 829	7, 285, 669	274, 673, 437	11, 580, 628

OPERATING UNITS: BY STATES

Items	Maryland	Virginia	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels	1, 179	1, 407	2, 586
On boats and shore—			
Regular	5, 083	1, 980	7, 063
Casual	2, 167	6, 654	8, 821
Total	8, 429	10, 041	18, 470
Vessels:			
Steam	-----	30	30
Net tonnage	-----	3, 118	3, 118
Motor	3	92	95
Net tonnage	18	1, 102	1, 120
Sail	264	17	281
Net tonnage	2, 852	249	3, 101
Total vessels	267	139	406
Total net tonnage	2, 870	4, 469	7, 339
Boats:			
Motor	3, 727	4, 188	7, 915
Other	2, 031	3, 451	5, 482
Accessory boats	18	-----	18
Apparatus:			
Purse seines—			
Menhaden	-----	31	31
Length, yards	-----	8, 400	8, 400
Other	16	-----	16
Length, yards	4, 564	-----	4, 564
Haul seines	198	196	394
Length, yards	39, 194	41, 340	80, 534
Gill nets—			
Anchor	33	-----	33
Square yards	2, 363	-----	2, 363
Drift	609	756	1, 365
Square yards	589, 085	840, 661	1, 429, 746
Runaround	1	-----	1
Square yards	2, 400	-----	2, 400
Stake	2, 966	14, 526	17, 492
Square yards	201, 498	550, 604	752, 102
Lines—			
Hand	18	10	28
Hooks	36	10	46
Trot with baits or snoods	1, 408	1, 064	2, 472
Baits or snoods	789, 764	494, 500	1, 284, 264
Trot with hooks	361	-----	361
Hooks	4, 650	-----	4, 650
Pound nets	780	2, 190	2, 970
Stop nets	5	-----	5
Square yards	3, 600	-----	3, 600
Fyke nets	2, 381	926	3, 307
Dip nets	1, 180	405	1, 585
Cast nets	5	-----	5
Otter trawls	-----	5	5
Yards at mouth	-----	147	147
Pots, eel	12, 942	160	13, 102
Spears	7	2	9
Scrapes	1, 102	593	1, 695
Yards at mouth	1, 102	593	1, 695
Dredges—			
Crab	-----	124	124
Yards at mouth	-----	226	226
Oyster	766	150	916
Yards at mouth	944	174	1, 118
Scallop	-----	819	819
Yards at mouth	-----	546	546
Tongs	4, 400	4, 244	8, 644
Rakes	121	1, 000	1, 121
Picks	7	-----	7

Fisheries of the Chesapeake Bay States, 1929—Continued

CATCH: BY STATES

Species	Maryland		Virginia		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	5, 923, 455	$85, 488	12, 570, 056	$181, 616	18, 493, 511	$267, 104
Black bass	14, 321	2, 632	86, 500	10, 483	100, 821	13, 115
Bluefish	211, 948	20, 158	510, 063	20, 505	722, 011	40, 663
Bonito	10, 600	636	109, 027	4, 843	119, 627	5, 479
Butterfish	911, 050	73, 173	5, 532, 452	310, 045	6, 443, 502	383, 218
Cabio, or crab eater	350	18	----------	----------	350	18
Carp	251, 656	27, 610	279, 800	14, 411	531, 456	42, 021
Catfish and bullheads	394, 054	22, 821	246, 525	13, 420	640, 579	36, 241
Cod	----------	----------	55, 777	2, 305	55, 777	2, 305
Croaker	2, 206, 899	64, 613	14, 413, 937	348, 586	16, 620, 836	413, 199
Drum:						
Black	32, 000	480	19, 350	763	51, 350	1, 243
Red	2, 300	54	9, 200	337	11, 500	391
Eels	322, 986	33, 366	58, 595	5, 803	381, 581	39, 169
Flounders	123, 494	5, 789	344, 406	21, 764	467, 900	27, 553
Gizzard shad	29, 669	1, 404	79, 900	2, 275	109, 569	3, 679
Hickory shad	17, 712	769	145, 050	8, 243	162, 762	9, 012
King whiting or "kingfish"	3, 200	320	54, 650	4, 618	57, 850	4, 938
Mackerel	48, 800	3, 664	55, 240	2, 259	104, 040	5, 923
Menhaden	----------	----------	99, 229, 250	823, 020	99, 229, 250	823, 020
Mullet	20, 960	1, 248	46, 250	2, 756	67, 210	4, 004
Pigfish	----------	----------	3, 700	157	3, 700	157
Pike	18, 178	3, 371	1, 000	150	19, 178	3, 521
Pompano	150	30	----------	----------	150	30
Scup	55, 000	3, 850	177, 000	12, 116	232, 000	15, 966
Sea bass	63, 400	4, 438	30, 685	4, 896	94, 085	9, 334
Sea robin	1, 600	16	----------	----------	1, 600	16
Shad	1, 549, 105	223, 380	7, 976, 581	1, 378, 725	9, 525, 686	1, 602, 105
Skates	1, 600	8	----------	----------	1, 600	8
Spanish mackerel	300	60	20, 500	2, 320	20, 800	2, 380
Spot	117, 557	6, 979	871, 954	46, 473	989, 511	53, 452
Squeteagues or "sea trout"	2, 997, 125	141, 363	8, 391, 626	345, 733	11, 388, 751	487, 096
Striped bass	1, 291, 595	217, 185	289, 551	54, 600	1, 581, 146	271, 785
Sturgeon	85	25	9, 064	2, 102	9, 149	2, 127
Sunfish	1, 550	98	----------	----------	1, 550	98
Tautog	300	18	----------	----------	300	18
Tomcod	800	24	----------	----------	800	24
White perch	391, 026	28, 572	150, 625	13, 703	541, 651	42, 275
Whiting	78, 000	3, 900	43, 850	1, 917	121, 850	5, 817
Yellow perch	140, 563	13, 111	18, 950	1, 878	159, 513	14, 989
Total	17, 233, 388	990, 671	151, 831, 114	3, 642, 822	169, 064, 502	4, 633, 493
SHELLFISH, ETC.						
Crabs:						
Hard	25, 455, 130	469, 720	30, 377, 626	564, 539	55, 832, 756	1, 034, 259
Soft	2, 644, 548	329, 849	1, 700, 200	103, 790	4, 344, 748	433, 639
Squid	40, 000	2, 000	142, 744	4, 282	182, 744	6, 282
Clams:						
Hard, public	74, 848	37, 644	899, 776	331, 569	974, 624	369, 213
Hard, private	----------	----------	11, 867	4, 947	11, 867	4, 947
Oysters:						
Market, public	16, 055, 047	2, 181, 561	5, 872, 433	623, 791	21, 927, 480	2, 805, 352
Market, private	1, 687, 987	272, 326	10, 894, 949	1, 446, 607	12, 582, 936	1, 718, 933
Seed, public	193, 760	11, 072	8, 409, 422	355, 429	8, 603, 182	366, 501
Scallops, bay	----------	----------	1, 145, 598	207, 883	1, 145, 598	207, 883
Turtles	2, 900	116	100	10	3, 000	126
Total	46, 154, 220	3, 304, 288	59, 454, 715	3, 642, 847	105, 608, 935	6, 947, 135
Grand total	63, 387, 608	4, 294, 959	211, 285, 829	7, 285, 669	274, 673, 437	11, 580, 628

PRODUCTION OF CERTAIN SHELLFISH SHOWN IN NUMBERS AND BUSHELS

Products	Maryland		Virginia		Total	
Crabs:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Hard .... number	76, 365, 390	$469, 720	91, 132, 878	$564, 539	167, 498, 268	$1, 034, 259
Soft .... do	7, 933, 644	329, 849	5, 100, 600	103, 790	13, 034, 244	433, 639
Clams:						
Hard, public .... bushels	9, 356	37, 644	112, 472	331, 569	121, 828	369, 213
Hard, private .... do	----------	----------	1, 483	4, 947	1, 483	4, 947
Oysters:						
Market, public .... do	2, 293, 578	2, 181, 561	838, 919	623, 791	3, 132, 497	2, 805, 352
Market, private .... do	241, 141	272, 326	1, 556, 421	1, 446, 607	1, 797, 562	1, 718, 933
Seed, public .... do	27, 680	11, 072	1, 201, 346	355, 429	1, 229, 026	366, 501
Scallops, bay .... do	----------	----------	190, 933	207, 883	190, 933	207, 883

Industries related to the fisheries of the Chesapeake Bay States, 1929

Items	Maryland	Virginia	Total
Transporting:	*Number*	*Number*	*Number*
Persons engaged	423	432	855
Vessels—			
Steam		2	2
Net tonnage		175	175
Motor	187	225	412
Net tonnage	2, 718	2, 578	5, 296
Sail	43	2	45
Net tonnage	1, 464	63	1, 527
Total vessels	230	229	459
Total net tonnage	4, 182	2, 816	6, 998
Wholesale:			
Establishments	298	152	450
Persons engaged	3, 580	2, 918	6, 498
Salaries and wages paid	$1, 593, 468	$1, 133, 580	$2, 727, 048
Manufacturing:			
Establishments	17	41	58
Persons engaged	530	929	1, 459
Salaries and wages paid	$164, 416	$434, 911	$599, 327
Products	$1, 084, 051	$1, 803, 596	$2, 887, 647
Fishermen's prepared products:			
Persons engaged	53	3	56
Products	$13, 124	$500	$13, 624

MARYLAND

The fisheries and industries related to the fisheries of Maryland in 1929 employed 12,962 fishermen, which is a decrease of 34 per cent, as compared with the number employed in 1925—the most recent year for which comparable data are available. Of the total number of persons, 8,429 were fishermen, 423 were employed on transporting vessels, 3,580 in the wholesale trade, and 530 in manufacturing industries. Of the fishermen, 53 also were engaged in the manufacture of prepared fishery products.

The total catch amounted to 63,387,608 pounds, valued at $4,294,959, which is an increase of 11 per cent in the catch but a decrease of 12 per cent in the value of the catch, as compared with the catch and its value in 1925. Of the total value of the catch, that of oysters accounted for 57 per cent; crabs, 19 per cent; and striped bass and shad, each, 5 per cent. Of the total weight of the catch, that of crabs accounted for 44 per cent; oysters, 28 per cent; alewives, 9 per cent; and squeteagues or "sea trout," 5 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Maryland during 1929 was taken by 8,429 fishermen who used 3 motor vessels, 264 sailing vessels, 5,758 motor and other small fishing boats, and 16 major types of gear. The vessels had a combined capacity of 2,870 net tons. The fisheries accounting for the greatest number of persons were the tong fishery employing 4,438 fisherman and the dredge fishery employing 1,366 fishermen.

CATCH BY GEAR

Four types of gear accounted for 87 per cent of the fishery products taken in the fisheries of Maryland during 1929. Listed in order of their importance they were: Lines, which accounted for 38 per cent of the catch; tongs, 22 per cent; pound nets, 20 per cent; and oyster dredges, 7 per cent. The catch by lines was principally hard crabs; that by tongs, almost exclusively oysters; that by pound nets, chiefly alewives, squeteagues, and croaker; and that by oyster dredges, exclusively oysters.

OPERATING UNITS BY COUNTIES

Somerset County was foremost in the number of persons fishing, accounting for 19 per cent of the total. Dorchester County followed with 17 per cent. Other counties employing a considerable number of fishermen were Talbot, St. Marys, Anne Arundel, and Queen Annes. Somerset County accounted for 41 per cent of the total number of fishing vessels, and Dorchester County accounted for 37 per cent. Somerset County also led in the number of motor and other small fishing boats, accounting for 25 per cent of the total. Dorchester County followed with 14 per cent.

CATCH BY COUNTIES

Fishing was prosecuted along the coast and in the coastal rivers and bays of 16 counties of Maryland during 1929. Ranked according to value, the fisheries of Dorchester County were most important, accounting for 26 per cent of the total catch and 19 per cent of the total value of the catch. Somerset was next in importance, accounting for 13 per cent of the quantity and 18 per cent of the value. Other important producing counties listed in order of their importance with respect to the value of this catch were Talbot, Queen Annes, Worcester, Kent, and Anne Arundel.

Fisheries of Maryland, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines	Haul seines	Gill nets				Lines			Pound nets	Stop nets
			Anchor	Drift	Run-around	Stake	Hand	Trot with baits or snoods	Trot with hooks		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	63										
On boats and shore—											
Regular	38	313	14	34	3	83	18	1, 193	11	498	2
Casual	6	331	2	346		149		146	17	256	8
Total	107	644	16	380	3	232	18	1, 339	28	754	10
Vessels:											
Sail—											
5 to 10 tons	1										
11 to 20 tons	2										
21 to 30 tons	6										
Total	9										
Net tonnage	188										
Total vessels	9										
Total net tonnage	188										
Boats:											
Motor	19	120	7	120	1	106	9	1, 053		260	2
Other	4	189	2	125	1	117		253	19	316	2
Accessory boats	18										
Apparatus:											
Number	16	198	33	609	1	2, 966	18	1, 408	361	780	5
Length, yards	4, 564	39, 194									
Square yards			2, 363	589, 085	2, 400	201, 498					3, 600
Hooks, baits or snoods							36	789, 764	4, 650		

Fisheries of Maryland, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Fyke nets	Dip nets	Cast nets	Pots, eel	Spears	Scrapes	Dredges, oyster	Tongs	Rakes	Picks	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							1, 146	5				1, 179
On boats and shore—												
Regular	45	940	4	124	7	575	212	3, 437	96			5, 083
Casual	98	240	1	43		28	8	996	25	7	11	2, 167
Total	143	1, 180	5	167	7	603	1, 366	4, 438	121	7	11	8, 429
Vessels:												
Motor—												
5 to 10 tons							1	2				3
Net tonnage							7	11				18
Sail—												
5 to 10 tons							205					205
11 to 20 tons							26					27
21 to 30 tons							17					20
31 to 40 tons							6					6
41 to 50 tons							4					4
51 to 60 tons							2					2
Total							260					264
Net tonnage							2, 766					2, 852
Total vessels							261	2				267
Total net tonnage							2, 773	11				2, 870
Boats:												
Motor	70	441		135	2		20	2, 559	46			3, 727
Other	75	676	5	22	5	536	102	189	26	7	11	2, 031
Accessory boats												18
Apparatus:												
Number	2, 381	1, 180	5	12, 942	7	1, 102	766	4, 400	121	7		
Yards at mouth						1, 102	944					

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			143, 500	$904			188, 550	$1, 984
Black bass			9, 885	1, 919				
Bluefish	39, 000	$4, 091	22, 780	2, 461			10, 150	817
Carp			166, 637	17, 783			6, 000	600
Catfish and bullheads			142, 525	8, 033			100	6
Croaker	50, 050	2, 005	828, 320	28, 975			10, 550	230
Eels			3, 560	382				
Flounders			5, 690	324				
Gizzard shad			700	100				
Mullet			650	38	18, 050	$1, 083		
Pike			6, 880	1, 405			100	20
Shad			4, 422	660			410, 727	49, 117
Spot	3, 700	260	46, 550	2, 940				
Squeteagues or "sea trout"	149, 625	14, 822	123, 698	9, 387			300	30
Striped bass	163, 400	25, 562	221, 875	41, 117	500	125	361, 275	55, 546
Sunfish			1, 250	88				
White perch			86, 111	7, 232	4, 000	320	28, 525	2, 193
Yellow perch			32, 825	3, 327			4, 050	338
Crabs: Soft			25, 520	3, 492				
Total	405, 775	46, 740	1, 873, 378	130, 567	22, 550	1, 528	1, 020, 327	110, 881

Fisheries of Maryland, 1929—Continued

CATCH: BY GEAR—Continued

Species	Gill nets				Lines			
	Runaround		Stake		Hand		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			14, 500	$250				
Black bass			250	37				
Bluefish	18, 000	$1, 800			88, 000	$7, 920		
Bonito					5, 000	300		
Carp			200	14				
Catfish and bullheads			1, 750	89				
Croaker			3, 050	210	3, 600	72		
Flounders					12, 000	480		
Gizzard shad			524	26				
Hickory shad			1, 712	66				
Mullet			215	17				
Pike			300	45				
Scup					20, 000	1, 400		
Sea bass					63, 000	4, 410		
Shad			365, 308	52, 690				
Squeteagues or "sea trout"			2, 300	200	24, 600	984		
Striped bass			132, 250	20, 969				
White perch			16, 155	1, 366				
Yellow perch			2, 200	210				
Crabs: Hard							24, 013, 540	$441, 996
Total	18, 000	1, 800	540, 714	76, 189	216, 200	15, 566	24, 013, 540	441, 996

Species	Lines, trot with hooks		Pound nets		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			5, 569, 955	$82, 174			6, 950	$176
Black bass			536	116	25	$4	3, 625	556
Bluefish			34, 018	3, 069				
Bonito			5, 600	336				
Butterfish			911, 050	73, 173				
Cabio or crab eater			350	18				
Carp			18, 744	1, 656	9, 500	1, 425	10, 575	1, 092
Catfish and bullheads	10, 000	$631	116, 111	6, 599			123, 568	7, 463
Croaker			1, 308, 929	33, 061			2, 400	60
Drum:								
Black			32, 000	480				
Red			2, 300	54				
Eels	2, 100	210	20, 856	2, 338			15, 650	1, 615
Flounders			105, 729	4, 981			75	4
Gizzard shad			27, 245	1, 242			1, 200	36
Hickory shad			16, 000	703				
King whiting or "kingfish"			3, 200	320				
Mackerel			48, 800	3, 664				
Mullet			1, 945	102			100	8
Pike			653	149			10, 245	1, 752
Pompano			150	30				
Scup			35, 000	2, 450				
Sea bass			400	28				
Sea robin			1, 600	16				
Shad			768, 648	120, 913				
Skates			1, 600	8				
Spanish mackerel			300	60				
Spot			67, 307	3, 779				
Squeteagues or "sea trout"			2, 696, 602	115, 940				
Striped bass			406, 271	72, 795			6, 024	1, 071
Sturgeon			85	25				
Sunfish			300	10				
Tautog			300	18				
Tomcod			800	24				
White perch			162, 110	10, 990			94, 125	6, 471
Whiting			78, 000	3, 900				
Yellow perch			17, 323	1, 764			84, 165	7, 472
Squid			40, 000	2, 000				
Turtles	2, 700	108					200	8
Total	14, 800	949	12, 500, 817	548, 985	9, 525	1, 429	358, 902	27, 784

Species	Dip nets		Cast nets		Pots, eel		Spears		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp			40, 000	$5, 040						
Eels					261, 320	$27, 171	19, 500	$1, 650		
Crabs:										
Hard	502, 570	$9, 879							939, 020	$17, 845
Soft	1, 008, 352	125, 021							1, 610, 676	201, 336
Total	1, 510, 922	134, 900	40, 000	5, 040	261, 320	27, 171	19, 500	1, 650	2, 549, 696	219, 181

Fisheries of Maryland, 1929—Continued

CATCH: BY GEAR—Continued

Species	Dredges, oyster		Tongs		Rakes		Picks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard			67,528	$33,764	6,000	$3,000	720	$480	600	$400
Oysters:										
Market, public	3,978,836	$618,628	12,076,211	1,562,933						
Market, private	187,768	31,144	1,472,219	236,182	28,000	5,000				
Seed, public			193,760	11,072						
Total	4,166,604	649,772	13,809,718	1,843,951	34,000	8,000	720	480	600	400

OPERATING UNITS: BY COUNTIES

Items	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5	114	22				419	
On boats and shore—								
Regular	326	7	119	3	2	100	841	
Casual	404	36	277	44	112	228	152	48
Total	735	157	418	47	114	328	1,412	48
Vessels:								
Motor—								
5 to 10 tons	2		1					
Net tonnage	11		7					
Sail—								
5 to 10 tons			2				91	
11 to 20 tons		5					4	
21 to 30 tons		6	1				3	
31 to 40 tons		4						
41 to 50 tons		3						
51 to 60 tons		1	1					
Total		19	4				98	
Net tonnage		543	88				804	
Total vessels	2	19	5				98	
Total net tonnage	11	543	95				804	
Boats:								
Motor	358	21	165	7	49	123	625	28
Other	117	25	124	20	39	102	180	19
Accessory boats		10						
Apparatus:								
Purse seines	2	5						
Length, yards	600	1,490						
Haul seines	52	7	17	5	11	20	7	5
Length, yards	4,966	1,850	3,610	1,150	1,800	3,130	2,175	1,900
Gill nets—								
Anchor			25					
Square yards			1,050					
Drift	4		2	34	11	63	9	75
Square yards	1,500		750	12,840	14,120	283,145	3,470	38,000
Stake		107	40		100	92	32	512
Square yards		9,810	1,216		3,440	2,026	1,290	15,540
Lines—								
Trot with baits or snoods	87	14	138			28	405	
Baits or snoods	40,000	10,200	42,450			11,735	285,636	
Trot with hooks	115		35	200				
Hooks	875		275	200				
Pound nets	26	10	31	17	26	56	184	2
Stop nets				5				
Square yards				3,600				
Fyke nets	172	242		36	653	36	4	88
Dip nets	68		60			10	141	
Pots, eel	262	560			50	10	4,935	600
Scrapes							80	
Yards at mouth							80	
Dredges, oyster		36	10				286	
Yards at mouth		53	13				339	
Tongs	625		258			142	543	

Fisheries of Maryland, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	28			14	473	104		
On boats and shore—								
Regular	425	6	684	386	1,011	686	235	252
Casual	125	36	32	368	117	63	45	80
Total	578	42	716	768	1,601	853	280	332
Vessels:								
Sail—								
5 to 10 tons	1			4	84	23		
11 to 20 tons				1	16	1		
21 to 30 tons	3				6	1		
31 to 40 tons					2			
41 to 50 tons					1			
Total	4			5	109	25		
Net tonnage	71			39	1,112	195		
Total vessels	4			5	109	25		
Total net tonnage	71			39	1,112	195		
Boats:								
Motor	229	11	333	374	631	500	134	139
Other	107	21	84	173	817	89	28	86
Accessory boats	8							
Apparatus:								
Purse seines	4					5		
Length, yards	1,011					1,463		
Haul seines	22	9	12	11	6	5	1	8
Length, yards	4,428	1,165	4,270	3,170	3,400	1,375	500	305
Gill nets—								
Anchor								8
Square yards								1,313
Drift	313	7			7	22	40	22
Square yards	165,460	12,670			4,200	25,160	22,550	5,220
Runaround					1			
Square yards					2,400			
Stake	1,580		135	10	372	3	183	
Square yards	132,180		20,136	1,330	7,680	270	6,570	
Lines—								
Hand								18
Hooks								36
Trot with baits or snoods	127		109	160	63	219	1	57
Baits or snoods	27,450		49,420	71,200	61,100	141,635	600	48,338
Trot with hooks	11							
Hooks	3,300							
Pounds nets	49	9	8	94	67	125	32	44
Fyke nets	805	67	128			55	16	79
Dip nets	18		68	104	664	42		5
Cast nets	3		2					
Pots, eel	501	14	1,130		300	4,260		320
Spears						7		
Scrapes					1,022			
Yards at mouth					1,022			
Dredges, oyster	2			18	324	50		40
Yards at mouth	3			32	400	70		34
Tongs	330		657	562	342	578	219	144
Rakes								121
Picks								7

Fisheries of Maryland, 1929—Continued

CATCH: By counties

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	359,855	$4,646	52,000	$1,540	611,400	$7,644	16,000	$290
Black bass	886	133	200	40			50	8
Bluefish	14,868	1,267	5,900	708	550	83		
Butterfish	700	70						
Carp	23,414	2,896	19,600	2,421	5,840	465	12,450	1,743
Catfish and bullheads	43,601	2,372	46,958	2,618	22,100	1,170	12,300	642
Croaker	137,299	4,044	7,500	372	118,000	2,690	1,400	42
Eels	13,041	1,693	16,900	1,856	50	5	450	45
Flounders	4,426	262	1,000	60	900	90		
Gizzard shad	9,175	275						
Mullet	300	18			350	17		
Pike	5,143	1,111	500	100	200	25		
Shad	32,843	5,453	500	100	89,485	12,818	4,600	714
Spanish mackerel					50	10		
Spot	11,562	528	1,000	50	1,100	55		
Squeteagues or "sea trout"	165,697	9,323	70,900	7,012	10,550	890	3,200	320
Striped bass	51,434	10,302	108,814	17,815	20,500	4,230	11,775	2,151
Sturgeon					85	25		
White perch	13,350	764	24,650	1,522	18,935	1,511	16,200	1,209
Yellow perch	13,968	1,407	7,350	629	2,960	296	5,150	597
Crabs:								
Hard	1,291,300	41,720	62,040	2,862	873,000	11,690		
Soft	24,011	3,650			28,200	2,820		
Oysters:								
Market, public	1,420,580	202,346	421,323	66,225	721,350	112,925		
Market, private					233,100	40,160		
Turtles	600	24			300	12	2,000	80
Total	3,638,053	294,304	847,135	105,930	2,759,005	199,631	85,575	7,841

Species	Cecil		Charles		Dorchester		Harford	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	264,000	$4,335	16,000	$250	703,000	$10,858	169,200	$1,088
Black bass	1,800	236	1,100	260				
Bluefish					18,830	1,676		
Carp	45,600	4,644	51,550	4,571	3,587	287	2,700	193
Catfish and bullheads	19,310	1,063	60,800	3,050	24,190	1,342	5,500	330
Croaker			4,100	124	195,400	5,005		
Eels	3,725	362	2,100	210	83,470	8,519	12,300	1,230
Flounders					29,875	1,226		
Gizzard shad	12,000	720	1,800	144	3,484	167		
Hickory shad	2,312	108						
Mullet	700	21			360	30		
Pike	1,250	211	1,300	303	120	30	315	70
Shad	118,300	16,635	145,094	15,548	158,085	23,663	34,800	5,220
Spot			200	10	10,810	757		
Squeteagues or "sea trout"			3,500	290	30,533	2,480		
Striped bass	13,450	2,620	31,850	6,450	112,890	19,845	5,200	1,040
Sunfish			1,550	98				
White perch	26,320	1,359	29,450	2,424	80,411	5,329	6,900	552
Yellow perch	3,340	190	9,100	910	220	22	2,200	176
Crabs:								
Hard			374,000	5,200	11,328,760	191,724		
Soft			4,000	500	211,398	26,426		
Oysters:								
Market, public			161,000	23,300	2,974,861	466,078		
Market, private			109,053	18,695	214,949	33,336		
Total	512,107	32,504	1,007,547	82,337	16,185,233	798,800	239,115	9,899

Fisheries of Maryland, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	573, 000	$6, 190	10, 750	$160	6, 000	$88	636, 850	$10, 660
Black bass	2, 285	355	8, 000	1, 600	--------	--------	--------	--------
Bluefish	5, 700	661	--------	--------	8, 600	1, 032	7, 300	735
Butterfish	1, 250	185	--------	--------	--------	--------	1, 500	150
Carp	53, 900	6, 977	14, 650	1, 242	9, 450	1, 378	525	46
Catfish and bullheads	62, 875	3, 698	25, 850	1, 602	19, 950	1, 065	300	15
Croaker	80, 600	3, 386	--------	--------	120, 800	5, 720	62, 700	2, 043
Eels	16, 750	1, 628	3, 050	305	26, 700	2, 853	600	60
Flounders	525	34	--------	--------	300	18	5, 148	521
Gizzard shad	--------	--------	--------	--------	--------	--------	2, 460	75
Hickory shad	--------	--------	--------	--------	--------	--------	13, 400	560
Mullet	--------	--------	500	44	--------	--------	--------	--------
Pike	7, 400	1, 098	550	115	1, 400	308	--------	--------
Shad	411, 153	54, 028	18, 482	1, 580	19, 610	3, 031	146, 179	24, 214
Spot	10, 100	808	--------	--------	10, 800	756	5, 610	335
Squeteagues or "sea trout"	344, 600	34, 460	1, 500	150	22, 875	2, 369	54, 000	4, 141
Striped bass	596, 725	89, 607	2, 060	412	78, 950	13, 655	126, 200	25, 295
White perch	97, 475	7, 413	14, 875	1, 250	16. 100	1, 581	9, 400	820
Yellow perch	57, 500	4, 667	3, 150	339	21, 000	2, 121	450	45
Crabs:								
Hard	426, 000	7, 895	--------	--------	1, 328, 840	24, 074	1, 603, 000	21, 104
Soft	26, 560	3, 320	--------	--------	31, 990	4, 000	35, 800	3, 490
Oysters:								
Market, public	1, 187, 900	88, 185	--------	--------	2, 982, 910	332, 420	743, 750	111, 760
Market, private	--------	--------	--------	--------	19, 600	2, 215	39, 900	6, 840
Seed, public	193, 760	11, 072	--------	--------	--------	--------	--------	--------
Total	4, 156, 058	325, 667	103, 417	8, 799	4, 725, 875	398, 684	3, 495, 072	212, 909

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	358, 800	$5, 282	2, 080, 600	$31, 208	49, 800	$924	16, 200	$325
Bluefish	19, 200	1, 920	31, 000	3, 076	--------	--------	100, 000	9, 000
Bonito	--------	--------	--------	--------	--------	--------	10, 600	636
Butterfish	4, 900	552	--------	--------	--------	--------	902, 700	72, 216
Cabio or crab eater	--------	--------	--------	--------	--------	--------	350	18
Carp	--------	--------	5, 250	450	1, 600	160	1, 540	137
Catfish and bullheads	5, 850	461	19, 850	1, 419	18, 570	1, 282	6, 050	692
Croaker	690, 800	22, 146	224, 500	7, 761	137, 600	2, 752	426, 200	8, 528
Drum:								
Black	--------	--------	--------	--------	--------	--------	32, 000	480
Red	1, 100	30	--------	--------	--------	--------	1, 200	24
Eels	3, 900	390	107, 250	10, 623	--------	--------	32, 700	3, 587
Flounders	12, 895	548	2, 840	186	3, 510	160	62, 075	2, 684
Gizzard shad	750	23	--------	--------	--------	--------	--------	--------
Hickory shad	950	48	--------	--------	1, 050	53	--------	--------
King whiting or "kingfish"	--------	--------	--------	--------	--------	--------	3, 200	320
Mackerel	--------	--------	--------	--------	--------	--------	48, 800	3, 664
Mullet	--------	--------	--------	--------	700	35	18, 050	1, 083
Pompano	--------	--------	--------	--------	--------	--------	150	30
Scup	--------	--------	--------	--------	--------	--------	55, 000	3, 850
Sea bass	--------	--------	--------	--------	--------	--------	63, 400	4, 438
Sea robin	--------	--------	--------	--------	--------	--------	1, 600	16
Shad	74, 610	12 556	243, 334	39, 082	23, 400	4, 471	28, 630	4, 267
Skates	--------	--------	--------	--------	--------	--------	1, 600	8
Spanish mackerel	--------	--------	--------	--------	--------	--------	250	50
Spot	9, 225	559	6, 750	497	10, 400	624	40, 000	2, 000
Squeteagues or "sea trout"	63, 700	4, 031	121, 600	12, 160	11, 520	650	2, 092, 950	63, 087
Striped bass	15, 800	2, 762	104, 447	18, 849	10, 700	1, 994	800	158
Tautog	--------	--------	--------	--------	--------	--------	300	18
Tomcod	--------	--------	--------	--------	--------	--------	800	24
White perch	15, 800	1, 202	11, 000	768	9, 560	796	600	72
Whiting	--------	--------	--------	--------	--------	--------	78, 000	3, 900
Yellow perch	--------	--------	14, 175	1, 712	--------	--------	--------	--------
Crabs:								
Hard	2, 349, 590	46, 931	4, 716, 400	93, 677	18, 000	360	1, 084, 200	22, 483
Soft	2, 256, 517	282, 065	14, 034	2, 073	--------	--------	12, 038	1, 505
Squid	--------	--------	--------	--------	--------	--------	40, 000	2, 000
Clams, hard	--------	--------	--------	--------	--------	--------	74, 848	37, 644
Oysters:								
Market, public	2, 169, 160	331, 093	2, 774, 688	375, 504	497, 525	71, 725	--------	--------
Market, private	378, 336	57, 044	50, 533	6, 847	148, 400	21, 150	494, 116	86, 039
Total	8, 431, 883	769, 643	10, 528, 251	605, 892	942, 335	107, 136	5, 730, 947	334, 983

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 423 persons in Maryland engaged primarily in transporting fishery products by means of vessels. In this trade 187 motor vessels and 43 sailing vessels, having a combined capacity of 4,182 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 298 wholesale establishments in Maryland engaged primarily in handling fresh and frozen products. These establishments employed 3,580 persons, who received $1,593,468 in salaries and wages. Somerset County alone accounted for 132 of these establishments.

Manufacturing.—There were 17 establishments in Maryland in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 530 persons who received $164,416 in salaries and wages. The products manufactured, consisting principally of salted and smoked fish, canned oysters, canned alewife products and oyster-shell products, were valued at $1,027,529. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were 53 fishermen in Maryland preparing fishery products. Their output, consisting principally of salted alewives and salted eels, amounted to 238,040 pounds valued at $13,124.

Industries related to the fisheries of Maryland, 1929

TRANSPORTING

Items	Number	Items	Number
Persons engaged on transporting vessels	423	Transporting vessels—Continued.	
Transporting vessels:		Sail—	
Motor—		5 to 10 tons	6
5 to 10 tons	96	11 to 20 tons	6
11 to 20 tons	51	21 to 30 tons	8
21 to 30 tons	24	31 to 40 tons	8
31 to 40 tons	10	41 to 50 tons	5
41 to 50 tons	6	51 to 60 tons	7
		71 to 80 tons	2
		81 to 90 tons	1
Total	187	Total	43
Net tonnage	2,718	Net tonnage	1,464
		Total vessels	230
		Total net tonnage	4,182

WHOLESALE

Items	Anne Arundel County	Baltimore City County	Calvert County	Cecil County	Dorchester County	Kent County
Establishments	10	61	7	3	31	7
Persons engaged:						
Proprietors	15	98	14	4	45	10
Salaried employees	4	111		1	11	
Wage earners	182	338	120	5	605	28
Paid to salaried employees	$6,348	$252,742	$600	$200	$5,922	
Paid to wage earners	69,952	334,792	30,095	8,000	210,694	14,380
Total salaries and wages	76,300	587,534	30,695	8,200	216,616	14,380

Industries related to the fisheries of Maryland, 1929—Continued

WHOLESALE—Continued

Items	Queen Annes County	St. Marys and Charles Counties	Somerset County	Talbot County	Wicomico and Worcester Counties	Total
Establishments	17	7	132	17	6	298
Persons engaged:						
Proprietors	20	9	244	28	8	495
Salaried employees	1		28	4		160
Wage earners	232	85	952	310	68	2,925
Paid to salaried employees	$1,200		$37,005	$1,050		$305,067
Paid to wage earners	72,532	$21,702	454,612	39,580	$32,062	1,288,401
Total salaries and wages	73,732	21,702	491,617	40,630	32,062	1,593,468

MANUFACTURING

Items	Number	Products[1]	Quantity	Value
Establishments	17	Salted, pickled, and smoked pounds	2,276,940	$262,610
Persons engaged:				
Proprietors	18	Canned:		
Salaried employees	28	Oysters standard cases[2]	30,853	193,266
Wage earners	484	Alewives do	37,181	117,744
		Alewife roe do	9,302	63,299
Paid to salaried employees	$42,428	By-products:		
Paid to wage earners	121,988	Oyster-shell products:		
		Poultry food tons	41,908	319,991
Total salaries and wages	164,416	Lime do	20,542	56,719
		Other products[3]		13,900
		Total		1,027,529

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged number	53	
Products:		
Fresh, sturgeon roe pounds	40	$24
Salted alewives do	158,000	5,100
Salted eels do	80,000	8,000
Total	238,040	13,124

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[1] Includes products prepared by 11 firms whose activities were principally in the wholesale fishery trade.

[2] A standard case contains forty-eight 5-ounce cans of oysters and forty-eight 1-pound cans of alewives and alewife roe.

[3] Includes crab scrap, alewife scrap, and alewife oil.

VIRGINIA

The fisheries and industries related to the fisheries of Virginia in 1929 employed 14,320 persons, which is a decrease of 26 per cent, as compared with the number employed in 1925—the most recent year for which comparable data are available. Of the total number of persons, 10,041 were fishermen, 432 were employed on transporting vessels, 2,918 in the wholesale trade, and 929 in the manufacturing industries. Of the fishermen, three also were engaged in the manufacture of prepared fishery products.

The total catch amounted to 211,285,829 pounds, valued at $7,285,669, which is a decrease of 24 per cent in the catch and 20 per cent in the value of the catch, as compared with the catch and its value in 1925. Of the total value of the catch, that of oysters accounted for 33 per cent; shad, 19 per cent; menhaden, 11 per cent; crabs, 9 per cent; and croakers, squeteagues, and clams, each 5 per cent. Of the total weight of the catch, that of menhaden accounted for 47 per cent; crabs, 15 per cent; oysters, 12 per cent; croakers, 7 per cent; and alewives, 6 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Virginia during 1929 was taken by 10,041 fishermen, who used 30 steam vessels, 92 motor vessels, 17 sailing vessels, 7,639 motor and other small fishing boats, and 14 major types of gear. The vessels had a combined capacity of 4,469 net tons. The fisheries accounting for the greatest number of persons were the fishery with tongs employing 4,250 fishermen, the pound-net fishery employing 2,139 fishermen, the trot-line fishery employing 1,054 fishermen, and the purse-seine fishery employing 1039 fishermen.

CATCH BY GEAR

Five types of gear accounted for 96 per cent of the fishery products taken in the fisheries of Virginia during 1929. Listed in order of their importance they were: Purse seines, which accounted for 47 per cent of the catch; pound nets, 23 per cent; lines and tongs, each, 10 per cent; and dredges, 6 per cent. The catch by purse seines was exclusively menhaden; that by pound nets was chiefly alewives, croaker, squeteagues or "sea trout," and shad; that by lines almost exclusively crabs; that by tongs principally oysters; and that by dredges consisted of crabs, oysters, and scallops.

OPERATING UNITS BY COUNTIES

Accomac County was foremost in the number of persons fishing, accounting for 17 per cent of the total. Northumberland County followed, accounting for 14 per cent. Other counties employing a considerable number of fishermen were Lancaster, Middlesex, Northampton, Mathews, York, and Gloucester. York County accounted for 29 per cent of the total number of fishing vessels, Northumberland County accounted for 19 per cent, and Elizabeth City County, 17 per cent. Accomac County led in the number of motor and other small fishing boats, accounting for 21 per cent of the total. Northampton followed with 13 per cent.

CATCH BY COUNTIES

Fishing was prosecuted along the coast and in the coastal rivers and bays of 31 counties in Virginia during 1929. Ranked according to value, the fisheries of Accomac County were most important, accounting for 14 per cent of the total catch and 19 per cent of the total value of the catch. Northumberland County was next in the value of the catch, accounting for 38 per cent of the quantity and 14 per cent of the value. Other important counties listed in order of their importance with respect to the value of the catch were Mathews and Lancaster.

Fisheries of Virginia, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines, menhaden	Haul seines	Gill nets		Lines		Pound nets	Fyke nets	Dip nets	Otter trawls
			Drift	Stake	Hand	Trot with baits or snoods				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	1,039	-------	-------	-------	-------	-------	-------	-------	-------	19
On boats and shore—										
Regular	-------	18	7	10	-------	777	659	7	120	-------
Casual	-------	450	774	236	1	277	1,480	116	285	-------
Total	1,039	468	781	246	1	1,054	2,139	123	405	19
Vessels:										
Steam—										
61 to 70 tons	3	-------	-------	-------	-------	-------	-------	-------	-------	-------
71 to 80 tons	6	-------	-------	-------	-------	-------	-------	-------	-------	-------
81 to 90 tons	7	-------	-------	-------	-------	-------	-------	-------	-------	-------
91 to 100 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
101 to 110 tons	2	-------	-------	-------	-------	-------	-------	-------	-------	-------
111 to 120 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
131 to 140 tons	2	-------	-------	-------	-------	-------	-------	-------	-------	-------
141 to 150 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
151 to 160 tons	2	-------	-------	-------	-------	-------	-------	-------	-------	-------
161 to 170 tons	2	-------	-------	-------	-------	-------	-------	-------	-------	-------
171 to 180 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
191 to 200 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total	29	-------	-------	-------	-------	-------	-------	-------	-------	-------
Net tonnage	3,093	-------	-------	-------	-------	-------	-------	-------	-------	-------
Motor—										
5 to 10 tons	-------	-------	-------	-------	-------	-------	-------	-------	-------	1
11 to 20 tons	-------	-------	-------	-------	-------	-------	-------	-------	-------	4
181 to 190 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total	1	-------	-------	-------	-------	-------	-------	-------	-------	5
Net tonnage	185	-------	-------	-------	-------	-------	-------	-------	-------	71
Sail—										
91 to 100 tons	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
Net tonnage	99	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total vessels	31	-------	-------	-------	-------	-------	-------	-------	-------	5
Total net tonnage	3,377	-------	-------	-------	-------	-------	-------	-------	-------	71
Boats:										
Motor	-------	167	172	133	1	716	657	79	80	-------
Other	-------	156	507	47	-------	358	467	34	325	-------
Accessory boats	52	-------	-------	-------	-------	-------	-------	-------	-------	-------
Apparatus:										
Number	31	196	756	14,526	10	1,064	2,190	926	405	5
Length, yards	8,400	43,265	-------	-------	-------	-------	-------	-------	-------	-------
Square yards	-------	-------	840,661	550,604	-------	-------	-------	-------	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	-------	-------	-------	-------	147
Hooks, baits, or snoods	-------	-------	-------	-------	10	494,500	-------	-------	-------	-------

Fisheries of Virginia, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Pots, eel	Spears	Scrapes	Dredges			Tongs	Rakes	By hand	Total, exclusive of duplication
				Crab	Oyster	Scallop				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels			4	173	165		15			1, 407
On boats and shore—										
Regular			78		2	190	972	154		1, 980
Casual	2	2	232	17	69	226	3, 263	846	418	6, 654
Total	2	2	314	190	236	416	4, 250	1, 000	418	10, 041
Vessels:										
Steam—										
21 to 30 tons					1					1
61 to 70 tons										3
71 to 80 tons										6
81 to 90 tons										7
91 to 100 tons										1
101 to 110 tons										2
111 to 120 tons										1
131 to 140 tons										2
141 to 150 tons										1
151 to 160 tons										2
161 to 170 tons										2
171 to 180 tons										1
191 to 200 tons										1
Total					1					30
Net tonnage					25					3, 118
Motor—										
5 to 10 tons				43	12		8			62
11 to 20 tons				12	10					26
21 to 30 tons				1	1					2
41 to 50 tons					1					1
181 to 190 tons										1
Total				56	24		8			92
Net tonnage				513	293		52			1, 102
Sail—										
5 to 10 tons			1		13					14
21 to 30 tons					2					2
91 to 100 tons										1
Total			1		15					17
Net tonnage			7		143					219
Total vessels			1	56	40		8			139
Total net tonnage			7	513	461		52			4, 469
Boats:										
Motor	2			6	3		2, 736	48	8	4, 188
Other		2	254		33	360	1, 097	939	410	3, 451
Accessory boats										52
Apparatus:										
Number	160	2	593	124	150	819	4, 244	1, 000		
Yards at mouth			593	226	174	546				

Fisheries of Virginia, 1929—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			113, 600	$2, 284	33, 450	$961	12, 200	$237
Black bass			86, 400	10, 468				
Bluefish			60, 820	5, 055	4, 200	378		
Butterfish			11, 260	902				
Carp			231, 200	12, 535				
Catfish and bullheads			88, 900	4, 953	2, 500	210		
Croaker			272, 800	10, 923	537, 600	14, 467	11, 602	360
Drum: Red			500	25	1, 500	45		
Eels			200	10				
Flounders			8, 780	568	5, 300	430	1, 228	101
Gizzard shad			40, 200	1, 068	500	35		
Hickory shad			1, 000	55	42, 900	2, 885		
King whiting or "kingfish"			5, 400	320	30, 100	2, 914		
Menhaden	98, 226, 400	$816, 721						
Mullet			10, 250	640	28, 700	1, 746	5, 600	280
Pigfish			3, 600	147	100	10		
Pike			500	75				
Scup			100	5				
Sea bass			1, 575	83				
Shad			17, 675	2, 725	695, 855	93, 050	561, 667	112, 788
Spanish mackerel			100	20	17, 700	1, 855		
Spot			195, 700	11, 348	188, 230	10, 549	2, 500	125
Squeteagues or "sea trout"			158, 150	11, 293	108, 600	9, 662	7, 627	602
Striped bass			16, 200	3, 140	62, 145	11, 918	45, 856	9, 521
Sturgeon					300	54		
White perch			44, 650	4, 120	3, 100	273	4, 300	675
Whiting			500	25	3, 000	150		
Yellow perch			1, 500	150	1, 600	160		
Total	98, 226, 400	816, 721	1, 371, 560	82, 937	1, 767, 380	151, 752	652, 580	124, 689

Species	Lines				Pound nets	
	Hand		Trot with baits or snoods			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					12, 369, 106	$176, 883
Bluefish					443, 943	15, 022
Bonito					109, 027	4, 843
Butterfish					5, 519, 892	309, 073
Carp					4, 150	225
Catfish and bullheads					34, 600	1, 777
Cod					55, 777	2, 305
Croaker					13, 079, 985	305, 951
Drum:						
Black					19, 350	763
Red					7, 200	267
Eels					48, 795	4, 840
Flounders					277, 648	16, 870
Gizzard shad					6, 500	308
Hickory shad					99, 750	5, 168
King whiting or "kingfish"					17, 050	1, 224
Mackerel					55. 240	2, 259
Menhaden					1, 002, 850	6, 299
Mullet					1, 500	75
Scup					85, 400	3, 606
Sea bass					2, 110	63
Shad					6, 672, 034	1, 164, 357
Spanish mackerel					2, 700	445
Spot					481, 424	24, 193
Squeteagues or "sea trout"					8, 072, 549	320, 821
Striped bass					147, 900	26, 486
Sturgeon					8, 764	2, 048
White perch					41, 050	3, 406
Whiting					38, 950	1, 632
Yellow perch					200	16
Crabs: Hard			21, 451, 640	$353, 601		
Squid					142, 744	4, 282
Turtles	100	$10				
Total	100	10	21, 451, 640	353, 601	48, 848, 188	2, 405, 507

Fisheries of Virginia, 1929—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Dip nets		Otter trawls, fish		Pots, eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	41,700	$1,251						
Black bass	100	15						
Bluefish	1,100	50						
Butterfish	1,300	70						
Carp	44,450	1,651						
Catfish and bullheads	120,525	6,480						
Croaker	101,950	4,085			410,000	$12,800		
Eels	2,600	253					6,000	$600
Flounders	10,450	745			41,000	3,050		
Gizzard shad	32,700	864						
Hickory shad	1,400	135						
King whiting or "kingfish"	2,100	160						
Mullet	200	15						
Pike	500	75						
Scup					91,500	8,505		
Sea bass					27,000	4,750		
Shad	29,350	5,805						
Spot	2,100	118			2,000	140		
Squeteagues or "sea trout"	17,200	1,455			27,500	1,900		
Striped bass	17,450	3,535						
White perch	57,525	5,229						
Whiting	1,400	110						
Yellow perch	15,650	1,552						
Crabs:								
Hard	6,000	75	390,000	$6,500				
Soft			422,320	30,286				
Total	507,750	33,728	812,320	36,786	599,000	31,145	6,000	600

Species	Spears		Scrapes		Dredges			
					Crab		Oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	1,000	$100						
Crabs:								
Hard			1,439,000	$24,050	7,072,800	$178,445		
Soft			1,277,880	73,504				
Oysters:								
Market, public							294,000	$39,555
Market, private							4,820,676	664,623
Total	1,000	100	2,716,880	97,554	7,072,800	178,445	5,114,676	704,178

Species	Dredges, scallop		Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs: Hard			18,186	$1,868				
Clams:								
Hard, public			826,816	304,209	72,960	$27,360		
Hard, private			9,275	3,975	2,592	972		
Oysters:								
Market, public			5,539,653	580,912			38,780	$3,324
Market, private			5,894,093	758,372	172,480	22,952	7,700	660
Seed, public			8,409,422	355,429				
Scallops, bay	1,126,788	$204,748	18,810	3,135				
Total	1,126,788	204,748	20,716,255	2,007,900	248,032	51,284	46,480	3,984

Fisheries of Virginia, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Accomac	Alexandria	Caroline	Charles City	Chesterfield	Elizabeth City	Essex	Fairfax	Gloucester	Isle of Wight
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	36	------	------	------	------	88	------	------	10	------
On boats and shore—										
Regular	525	------	------	------	------	319	------	------	190	------
Casual	1,110	22	5	222	7	------	124	33	321	281
Total	1,671	22	5	222	7	407	124	33	521	281
Vessels:										
Steam—										
21 to 30 tons	------	------	------	------	------	1	------	------	------	------
Net tonnage	------	------	------	------	------	25	------	------	------	------
Motor—										
5 to 10 tons	------	------	------	------	------	12	------	------	5	------
11 to 20 tons	------	------	------	------	------	10	------	------	------	------
21 to 30 tons	------	------	------	------	------	1	------	------	------	------
Total	------	------	------	------	------	23	------	------	5	------
Net tonnage	------	------	------	------	------	271	------	------	34	------
Sail—										
5 to 10 tons	10	------	------	------	------	------	------	------	------	------
Net tonnage	67	------	------	------	------	------	------	------	------	------
Total vessels	10	------	------	------	------	24	------	------	5	------
Total net tonnage	67	------	------	------	------	296	------	------	34	------
Boats:										
Motor	831	11	------	8	2	123	41	21	292	219
Other	796	------	3	178	5	45	65	2	215	39
Apparatus:										
Haul seines	15	------	------	6	2	------	4	1	------	3
Length, yards	5,230	------	------	1,800	300	------	860	75	------	600
Gill nets—										
Drift	67	11	2	227	7	------	5	15	6	3
Square yards	40,700	15,890	2,400	241,755	7,462	------	3,333	24,305	12,000	1,050
Stake	19	------	------	40	------	------	------	------	------	8,390
Square yards	4,760	------	------	1,320	------	------	------	------	------	276,870
Lines—										
Hand	10	------	------	------	------	------	------	------	------	------
Hooks	10	------	------	------	------	------	------	------	------	------
Trot with baits or snoods	316	------	------	------	------	50	------	------	32	38
Baits or snoods	159,600	------	------	------	------	37,500	------	------	9,800	19,000
Pound nets	268	------	1	------	------	281	8	------	148	11
Fyke nets	9	------	------	23	------	------	2	185	10	134
Dip nets	315	------	------	------	------	------	------	------	------	------
Otter trawls	------	------	------	------	------	5	------	------	------	------
Yards at mouth	------	------	------	------	------	147	------	------	------	------
Pots, eel	160	------	------	------	------	------	------	------	------	------
Spears	2	------	------	------	------	------	------	------	------	------
Scrapes	593	------	------	------	------	------	------	------	------	------
Yards at mouth	593	------	------	------	------	------	------	------	------	------
Dredges—										
Crab	------	------	------	------	------	26	------	------	------	------
Yards at mouth	------	------	------	------	------	42	------	------	------	------
Oyster	64	------	------	------	------	12	------	------	------	------
Yards at mouth	68	------	------	------	------	17	------	------	------	------
Scallop	585	------	------	------	------	------	------	------	------	------
Yards at mouth	390	------	------	------	------	------	------	------	------	------
Tongs	973	------	------	------	------	50	101	------	440	237
Rakes	486	------	------	------	------	------	------	------	------	------

Fisheries of Virginia, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	James City	King and Queen	King George	King William	Lancaster	Mathews	Middlesex	Nansemond	New Kent	Noroflk
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels		1			357	11	4			28
On boats and shore—										
Regular					200	150	150			18
Casual	78	52	91	88	726	423	481	141	72	50
Total	78	53	91	88	1,283	584	635	141	72	96
Vessels:										
Steam—										
61 to 70 tons					3					
71 to 80 tons					4					
81 to 90 tons					2					
141 to 150 tons					1					
Total					10					
Net tonnage					812					
Motor—										
5 to 10 tons		1			3	2	1			1
11 to 20 tons					2	1				3
41 to 50 tons										1
Total		1			5	3	1			5
Net tonnage		7			42	24	8			97
Total vessels		1			15	3	1			5
Total net tonnage		7			854	24	8			97
Boats:										
Motor	22		35	2	468	199	423	66	11	26
Other	49	46	24	79	135	49	115	11	49	23
Accessory boats					18					
Apparatus:										
Purse seines, menhaden					10					
Length, yards					2,550					
Haul seines	1	2	1		7	1	1		3	7
Length, yards	200	400	1,000		2,475	400	500		800	1,400
Gill nets—										
Drift	35	49	12	65	3	2		1	67	
Square yards	37,310	31,033	23,100	65,000	21,000	2,000		2,000	55,000	
Stake	2,580		330		2			1,071		
Square yards	77,400		35,270		1,330			53,846		
Lines—										
Trot with baits or snoods			3		81	67	130			1
Baits or snoods			1,200		27,000	33,500	58,550			400
Pound nets	11		33		255	431	14			12
Fyke nets	72		83	4	10		3	25	8	
Dredges—										
Crab						6				
Yards at mouth						11				
Oyster				2	8	2	2			10
Yards at mouth				2	10	3	3			13
Tongs	14	1		22	537	81	535	105		35

Fisheries of Virginia, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Northampton	Northumberland	Prince George	Princess Anne	Prince William	Richmond	Stafford	Surry	Warwick	Westmoreland	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	2	718	------	------	------	------	------	------	------	34	118
On boats and shore—											
Regular	100	47	------	55	------	------	------	------	48	40	138
Casual	519	609	32	236	46	133	87	36	219	114	296
Total	621	1,374	32	291	46	133	87	36	267	188	552
Vessels:											
Steam—											
71 to 80 tons	------	2	------	------	------	------	------	------	------	------	------
81 to 90 tons	------	5	------	------	------	------	------	------	------	------	------
91 to 100 tons	------	1	------	------	------	------	------	------	------	------	------
101 to 110 tons	------	2	------	------	------	------	------	------	------	------	------
111 to 120 tons	------	1	------	------	------	------	------	------	------	------	------
131 to 140 tons	------	2	------	------	------	------	------	------	------	------	------
151 to 160 tons	------	2	------	------	------	------	------	------	------	------	------
161 to 170 tons	------	2	------	------	------	------	------	------	------	------	------
171 to 180 tons	------	1	------	------	------	------	------	------	------	------	------
191 to 200 tons	------	1	------	------	------	------	------	------	------	------	------
Total	------	19	------	------	------	------	------	------	------	------	------
Net tonnage	------	2,281	------	------	------	------	------	------	------	------	------
Motor—											
5 to 10 tons	------	1	------	------	------	------	------	------	------	4	32
11 to 20 tons	1	------	------	------	------	------	------	------	------	2	7
21 to 30 tons	------	------	------	------	------	------	------	------	------	------	1
181 to 190	------	1	------	------	------	------	------	------	------	------	------
Total	1	2	------	------	------	------	------	------	------	6	40
Net tonnage	11	191	------	------	------	------	------	------	------	61	356
Sail—											
5 to 10 tons	------	4	------	------	------	------	------	------	------	------	------
21 to 30 tons	------	1	------	------	------	------	------	------	------	1	------
91 to 100 tons	------	1	------	------	------	------	------	------	------	------	------
Total	------	6	------	------	------	------	------	------	------	1	------
Net tonnage	------	157	------	------	------	------	------	------	------	25	------
Total vessels	1	27	------	------	------	------	------	------	------	7	40
Total net tonnage	11	2,629	------	------	------	------	------	------	------	86	356
Boats:											
Motor	345	298	5	104	26	38	28	31	144	74	295
Other	676	272	25	122	1	62	2	6	87	50	220
Accessory boats	------	34	------	------	------	------	------	------	------	------	------
Apparatus:											
Purse seines, menhaden	------	21	------	------	------	------	------	------	------	------	------
Length, yards	------	5,850	------	------	------	------	------	------	------	------	------
Haul seines	6	------	4	98	11	1	3	8	------	10	1
Length, yards	1,200	------	1,200	17,600	1,000	200	2,175	2,400	------	950	500
Gill nets—											
Drift	12	------	27	3	18	25	34	7	5	5	43
Square yards	3,680	------	28,782	1,220	45,666	16,700	50,340	7,455	6,000	9,500	86,000
Stake	12	------	------	4	4	------	11	1,360	702	1	------
Square yards	2,275	------	------	1,000	7,955	------	19,133	44,880	23,400	1,165	------
Lines—											
Trot with baits or snoods	93	112	------	34	------	------	------	------	17	48	42
Baits or snoods	42,750	31,200	------	6,800	------	------	------	------	10,100	15,700	41,400
Pound nets	158	393	------	17	3	22	1	------	15	69	39
Fyke nets	------	------	12	4	252	12	14	24	9	20	11
Dip nets	------	90	------	------	------	------	------	------	------	------	------
Dredges—											
Crab	2	------	------	------	------	------	------	------	------	------	90
Yards at mouth	3	------	------	------	------	------	------	------	------	------	170
Oyster	2	16	------	------	------	------	------	------	------	30	2
Yards at mouth	24	18	------	------	------	------	------	------	------	36	2
Scallop	234	------	------	------	------	------	------	------	------	------	------
Yards at mouth	156	------	------	------	------	------	------	------	------	------	------
Tongs	257	143	------	44	------	79	------	------	261	38	291
Rakes	324	------	------	------	------	------	------	------	------	------	190

Fisheries of Virginia, 1929—Continued

CATCH: BY COUNTIES

Species	Accomac		Alexandria		Caroline		Charles City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	796,100	$14,435			500	$15	18,000	$530
Bluefish	22,800	1,998						
Bonito	44,500	2,225						
Butterfish	2,520,100	139,333						
Carp					500	50	28,000	912
Catfish and bullheads	2,100	105			1,000	50	17,000	560
Cod	25,000	1,000						
Croaker	2,045,400	62,197						
Drum:								
Black	14,650	549						
Red	6,100	212						
Eels	31,500	3,150						
Flounders	33,050	1,581						
Gizzard shad							13,000	418
King whiting or "kingfish"	4,500	255						
Mackerel	8,000	370						
Menhaden	102,000	626						
Mullet	10,300	515						
Pigfish	3,300	132						
Scup	22,100	1,065						
Sea bass	1,575	83						
Shad	353,660	66,165	47,965	$4,410	900	200	325,800	40,205
Spanish mackerel	15,000	1,500						
Spot	78,800	4,382						
Squeteagues or "sea trout"	3,146,500	97,754						
Striped bass	3,000	450					12,095	1,789
Sturgeon	500	125						
White perch	8,150	621			500	75		
Whiting	24,000	1,200						
Crabs:								
Hard	13,581,400	232,500						
Soft	1,637,200	96,190						
Squid	2,000	60						
Clams: Hard, public	213,696	79,386						
Oysters:								
Market, public	351,785	34,942						
Market, private	2,786,000	396,860						
Seed, public	32,200	1,380						
Scallops, bay	917,388	152,898						
Turtles	100	10						
Total	28,844,454	1,396,254	47,965	4,410	3,400	390	413,895	44,414

Species	Chesterfield		Elizabeth City		Essex		Fairfax	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3,000	$60	236,237	$2,985	6,600	$240		
Bluefish			37,753	3,385				
Bonito			927	63				
Butterfish			572,691	20,361				
Carp	8,000	320			2,250	122		
Catfish and bullheads	4,000	120			4,800	235	15,500	$1,240
Croaker			4,787,746	100,233	5,300	175		
Flounders			149,957	8,664				
Gizzard shad			100	10				
Hickory shad			7,400	390				
Mullet					250	15		
Scup			91,500	8,505				
Sea bass			27,000	4,750				
Shad	6,500	975	602,462	120,440	750	150	72,755	7,085
Spot			137,045	6,966	980	190		
Squeteagues or "sea trout"			1,477,164	36,540				
Striped bass	1,500	230	11,500	1,150			3,160	620
Sturgeon			3,064	613				
White perch					3,550	245	11,000	1,100
Yellow perch							7,000	700
Crabs: Hard			2,342,520	58,627				
Clams: Hard, public			82,000	25,625				
Oysters:								
Market, public			100,100	10,180	112,980	16,115		
Market, private			947,926	124,477	96,775	12,280		
Seed, public			172,900	7,410				
Total	23,000	1,705	11,787,992	541,374	234,235	29,767	109,415	10,745

Fisheries of Virginia, 1929—Continued

CATCH: By counties—Continued

Species	Gloucester		Isle of Wight		James City		King & Queen	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	353, 000	$4, 670	14, 000	$470	46, 700	$1, 512	2, 300	$110
Bluefish	16, 500	515						
Bonito	600	35						
Butterfish	123, 400	5, 920						
Carp			5, 250	180	11, 700	453		
Catfish and bullheads			17, 700	542	38, 500	1, 655	300	15
Croaker	551, 600	21, 105	40, 902	2, 922	21, 800	872	6, 500	394
Drum:								
Black	1, 700	94						
Red	1, 600	80						
Flounders	50, 400	3, 632	7, 328	565	2, 000	100	300	15
Gizzard shad	2, 000	150	19, 600	392	9, 700	230		
Hickory shad	29, 800	2, 490					19, 000	1, 140
King whiting or "kingfish"	18, 000	1, 305					9, 000	738
Mullet	500	50	7, 500	260				
Scup	1, 000	50						
Shad	446, 300	79, 400	309, 117	58, 466	146, 500	26, 700	23, 300	4, 105
Spanish mackerel	200	20						
Spot	196, 900	9, 953			500	30		
Squeteagues or "sea trout"	469, 000	24, 150	21, 727	1, 844	2, 000	100	11, 500	829
Striped bass	400	80	30, 006	6, 065	19, 100	3, 910	4, 950	970
White perch	10, 900	705	14, 500	1, 156	200	12	1, 000	68
Whiting	1, 400	85						
Yellow perch	800	76						
Crabs: Hard	110, 080	1, 818	262, 080	4, 368				
Clams: Hard, public	141, 672	53, 137						
Oysters:								
Market, public	483, 805	48, 473	849, 450	60, 675				
Market, private	204, 750	28, 700	355, 397	30, 463	84, 000	9, 600	4, 200	600
Seed, public	758, 800	36, 360	2, 311, 372	99, 059				
Total	3, 975, 107	323, 053	4, 265, 929	267, 427	382, 700	45, 174	82, 350	8, 984

Species	King George		King William		Lancaster		Mathews	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	39, 460	$830	3, 700	$185	1, 349, 500	$19, 050	3, 502, 000	$36, 700
Bluefish					10, 470	1, 097	50, 000	4, 000
Butterfish					111, 470	11, 146		
Carp			300	15	1, 300	79		
Catfish and bullheads	17, 500	1, 294	3, 000	235	2, 400	129		
Cod							400	90
Croaker			900	50	167, 550	1, 061	2, 861, 000	49, 547
Eels					6, 095	320		
Flounders			300	15	12, 350	917		
Gizzard shad			500	35	2, 000	90		
Hickory shad			18, 350	1, 473	3, 150	98		
King whiting or "kingfish"			16, 100	1, 615				
Menhaden					30, 211, 600	243, 671		
Pike					500	75		
Shad	19, 392	3, 394	24, 270	4, 760	1, 036, 600	185, 738	2, 875, 000	505, 550
Spot			300	20	116, 889	5, 875	100, 900	5, 045
Squeteagues or "sea trout"			16, 600	1, 307	260, 700	20, 755	42, 500	2, 531
Striped bass	21, 200	4, 960	7, 160	1, 672	11, 900	2, 180		
White perch	23, 200	2, 554	2, 400	195	8, 175	769		
Whiting					800	85		
Yellow perch	600	60	300	30	750	50		
Crabs: Hard	38, 400	640			511, 200	6, 860	1, 399, 200	24, 870
Clams: Hard, public							1, 656	621
Oysters:								
Market, public					842, 835	120, 455	118, 440	16, 920
Market, private			253, 750	35, 050	156, 800	22, 400	105, 000	15, 000
Seed, public							48, 300	2, 070
Total	159, 752	13, 732	347, 930	46, 657	34, 825, 034	642, 900	11, 104, 396	662, 944

Fisheries of Virginia, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Middlesex		Nansemond		New Kent		Norfolk		Northampton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	10, 000	$100			12, 300	$255			24, 107	$362
Bluefish							4, 000	$520	22, 590	1, 880
Bonito									63, 000	2, 520
Butterfish							5, 000	250	2, 163, 591	129, 795
Carp	4, 000	120			8, 500	495				
Catfish and bullheads	2, 000	100	500	$27	6, 000	240				
Cod									30, 377	1, 215
Croaker	242, 000	3, 725	58, 000	1, 067			21, 000	760	1, 528, 909	47, 717
Drum: Black									3, 000	120
Eels									20, 400	2, 280
Flounders	1, 000	50			400	30			17, 271	804
Gizzard shad	1, 000	50			1, 000	20				
Hickory shad	500	15			7, 350	382				
King whiting or "kingfish"					7, 050	705				
Mackerel									47, 240	1, 889
Menhaden									70, 850	423
Mullet			2, 000	160			11, 500	700	6, 500	436
Pigfish									400	25
Pike	300	45								
Scup									62, 400	2, 496
Sea bass									2, 110	63
Shad	7, 500	1, 300	48, 200	14, 280	59, 900	8, 990	10, 500	2, 100	21, 385	3, 558
Spanish mackerel							2, 000	300	100	20
Spot							20, 500	1, 705	36, 690	2, 409
Squeteagues or "sea trout"	19, 600	1, 205			5, 500	545			2, 419, 085	120, 657
Striped bass			350	70	5, 980	1, 084			7, 200	1, 128
Sturgeon							1, 800	500	2, 300	294
White perch	500	40	150	15	400	40				
Whiting									16, 550	497
Yellow perch	500	75			100	10				
Crabs: Hard	1, 288, 800	21, 480	6, 000	75			36, 000	600	805, 146	14, 784
Squid									140, 744	4, 222
Clams: Hard, public									198, 512	74, 460
Oysters:										
Market, public	853, 776	130, 841	268, 100	23, 030					180, 250	15, 450
Market, private	268, 919	42, 258	495, 600	42, 480			3, 379, 250	430, 096	183, 750	15, 750
Seed, public			69, 300	2, 970					2, 800	75
Scallops, bay									228, 210	54, 985
Total	2, 700, 395	201, 404	948, 200	84, 174	114, 480	12, 796	3, 491, 550	437, 531	8, 305, 467	500, 314

Species	Northumberland		Prince George		Princess Anne		Prince William		Richmond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	5, 347, 332	$85, 772	12, 000	$350			20, 440	$508	18, 000	$605
Black bass					86, 500	$10, 483				
Bluefish	332, 600	5, 805			3, 700	640			7, 650	465
Butterfish	22, 500	2, 250			3, 700	190				
Carp			17, 000	600	162, 000	9, 600				
Catfish and bullheads			7, 500	375	3, 000	90	29, 100	2, 058	14, 300	670
Croaker	1, 325, 600	38, 303			9, 300	600			3, 700	270
Eels									500	38
Flounders	35, 550	2, 635								
Gizzard shad			8, 000	220						
Hickory shad	59, 500	2, 255								
Menhaden	68, 794, 800	577, 800								
Mullet					2, 500	105			200	15
Pike									200	30
Shad	1, 166, 100	173, 350	29, 900	4, 635	18, 300	3, 925	46, 177	5, 915	11, 350	2, 780
Spanish mackerel					500	125				
Spot	1, 450	94			25, 300	1, 410			300	24
Squeteagues or "sea trout"	316, 600	22, 564			23, 500	2, 200			100	15
Striped bass	73, 400	13, 481	2, 400	360			11, 000	2, 475		
Sturgeon					1, 400	570				
White perch	900	78			1, 100	60	24, 800	2, 360	6, 050	428
Whiting					1, 100	50				
Yellow perch							4, 500	450		
Crabs:										
Hard	1, 149, 800	16, 005			1, 656, 000	23, 160				
Soft	63, 000	7, 600								
Oysters:										
Market, public	160, 622	23, 355							49, 000	7, 000
Market, private	318, 920	48, 972			389, 900	84, 200			687, 920	89, 586
Total	79, 168, 674	1, 020, 319	76, 800	6, 540	2, 387, 800	137, 408	136, 017	13, 766	799, 270	101, 926

Fisheries of Virginia, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	44,000	$570	27,500	$620	--------	-------	683,280	$10,682	--------	-------
Bluefish	--------	-------	--------	-------	--------	-------	--------	-------	2,000	$200
Butterfish	--------	-------	--------	-------	--------	-------	--------	-------	10,000	800
Carp	--------	-------	18,500	740	--------	-------	12,500	725	--------	-------
Catfish and bullheads	5,600	400	21,500	825	--------	-------	33,225	2,455	--------	-------
Croaker	--------	-------	2,800	112	16,500	$595	20,330	1,067	697,100	15,814
Drum: Red	--------	-------	--------	-------	--------	-------	--------	-------	1,500	45
Eels	--------	-------	--------	-------	--------	-------	--------	-------	100	15
Flounders	--------	-------	--------	-------	10,900	1,260	--------	-------	23,600	1,496
Gizzard shad	1,000	20	20,500	580	500	40	1,000	20	--------	-------
Menhaden	--------	-------	--------	-------	--------	-------	--------	-------	50,000	500
Mullet	--------	-------	--------	-------	5,000	500	--------	-------	--------	-------
Shad	30,904	4,770	67,600	11,160	48,800	14,760	61,494	7,639	57,200	11,820
Spanish mackerel	--------	-------	--------	-------	--------	-------	--------	-------	2,700	355
Spot	--------	-------	--------	-------	--------	-------	--------	-------	155,400	8,370
Squeteagues or "sea trout"	--------	-------	--------	-------	16,800	1,499	22,950	1,162	119,800	10,076
Striped bass	3,600	875	13,600	2,146	5,400	1,050	35,150	6,755	5,500	1,100
White perch	5,900	680	--------	-------	1,400	140	25,750	2,342	100	20
Yellow perch	1,200	120	--------	-------	--------	-------	3,200	307	--------	-------
Crabs: Hard	--------	-------	--------	-------	123,000	2,050	590,400	9,112	6,477,600	147,590
Clams:										
Hard, public	--------	-------	--------	-------	--------	-------	--------	-------	262,240	98,340
Hard, private	--------	-------	--------	-------	--------	-------	--------	-------	11,867	4,947
Oysters:										
Market, public	--------	-------	--------	-------	329,000	23,500	143,885	21,050	1,028,405	71,805
Market, private	--------	-------	--------	-------	3,500	350	1,750	300	170,842	17,185
Seed, public	--------	-------	--------	-------	2,527,700	108,330	--------	-------	2,486,050	97,775
Total	92,204	7,435	172,000	16,183	3,088,500	154,074	1,634,914	63,616	11,562,004	488,253

INDUSTRIES RELATED TO THE FISHERIESS

Transporting.—In 1929 there were 432 persons in Virginia engaged primarily in transporting fishery products by means of vessels. In this trade, 2 steam vessels, 231 motor vessels, and 2 sailing vessels, having a combined capacity of 2,816 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 152 wholesale establishments in Virginia engaged primarily in handling fresh and frozen products. These establishments employed 2,918 persons, who received $1,133,580 in salaries and wages. Accomac County accounted for 68 of these establishments.

Manufacturing.—There were 41 establishments in Virginia in 1929 engaged primarily in the manufacture of fishery products and by-products. They employed 929 persons, who received $434,911 in salaries and wages. The products manufactured, consisting principally of menhaden and oyster-shell products, and canned and salted alewife products, were valued at $1,803,596. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were three fishermen in Virginia preparing fishery products. Their output, consisting entirely of sturgeon roe, amounted to 500 pounds, valued at $500.

Industries related to the fisheries of Virginia, 1929

TRANSPORTING

Items	Number	Items	Number
Persons engaged on transporting vessels	432	Transporting vessels—Continued	
Transporting vessels:		Motor—(Continued)	
Steam—		61 to 70 tons	1
71 to 80 tons	1	71 to 80 tons	1
91 to 100 tons	1	Total	231
Total	2	Net tonnage	2, 578
Net tonnage	175	Sail—	
Motor—		5 to 10 tons	1
5 to 10 tons	153	51 to 60 tons	1
11 to 20 tons	61	Total	2
21 to 30 tons	9	Net tonnage	63
31 to 40 tons	4	Total vessels	235
41 to 50 tons	1	Total net tonnage	2, 816
51 to 60 tons	1		

WHOLESALE

Items	Accomac County	Elizabeth City, York, and Warwick Counties	Gloucester County	Isle of Wight County	Lancaster County
Establishments	68	10	4	4	16
Persons engaged:					
Proprietors	94	12	4	7	25
Salaried employees	17	46	3	2	10
Wage earners	710	283	12	61	248
Paid to salaried employees	$7, 970	$70, 680	$1, 000	$1, 700	$4, 750
Paid to wage earners	265, 343	127, 570	2, 500	12, 350	68, 813
Total salaries and wages	273, 313	198, 250	3, 500	14, 050	73, 563

Items	Middlesex County	Norfolk County	Northampton County	Northumberland	Richmond and Essex Counties	Total
Establishments	6	9	15	14	6	152
Persons engaged:						
Proprietors	8	21	26	18	10	225
Salaried employees		91	9		3	181
Wage earners	70	630	329	46	123	2, 512
Paid to salaried employees		$90, 275	$7, 960		$2, 000	$186, 335
Paid to wage earners	$18, 634	243, 249	169, 410	$17, 426	21, 950	947, 245
Total salaries and wages	18, 634	333, 524	177, 370	17, 426	23, 950	1, 133, 580

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	41	Salted:		
Persons engaged:		Alewives ... pounds	3, 478, 945	$93, 199
Proprietors	59	Canned:		
Salaried employees	29	Alewives ... standard cases [2]	33, 128	104, 821
Wage earners	841	Alewife roe ... do	16, 389	101, 061
		By-products:		
Paid to salaried employees	$67, 780	Dry scrap, menhaden ... tons	12, 628	602, 291
Paid to wage earners	367, 131	Dry scrap and meal, miscellaneous ... tons	1, 226	51, 444
Total salaries and wages	434, 911	Oil, menhaden ... gallons	1, 107, 077	486, 996
		Oil, alewife ... do	18, 732	8, 171
		Oil, miscellaneous ... do	43, 948	4, 010
		Poultry feed, oyster shell ... tons	17, 478	156, 686
		Lime, oyster shell ... do	24, 008	171, 203
		Other products [3]		23, 714
		Total		1, 803, 596

Industries related to the fisheries of Virginia, 1929—Continued.

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged .... number ..	3	....
Sturgeon roe .... pounds ..	500	$500

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[1] Includes products prepared by two firms whose activities were principally in the wholesale fishery trade.

[2] A standard case contains forty-eight 1-pound cans of alewives or alewife roe.

[3] Includes canned crab meat and alewife scales.

HISTORICAL REVIEW

Twelve general surveys have been made for statistics of the Chesapeake Bay States during the 50-year period from 1880 to 1929. The catch for 1929, amounting to 274,673,000 pounds, was considerably less than that in any year since 1888. The largest catch was made in 1920, when 530,750,000 pounds were taken. Comparative statistics for the catch of each of the more important species are shown in the following tables.

Fisheries of the Chesapeake Bay States, 1880 to 1929

SUMMARY: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Year	Maryland		Virginia		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1880	95, 712	$5, 222	158, 875	$3, 124	254, 587	$8, 346
1887	107, 982	3, 514	97, 635	1, 607	205, 617	5, 121
1888	114, 788	3, 813	101, 319	1, 836	216, 107	5, 649
1890	143, 905	6, 019	185, 283	3, 637	329, 188	9, 656
1891	141, 178	6, 461	183, 994	3, 648	325, 172	10, 109
1897	88, 588	3, 617	277, 994	3, 180	366, 582	6, 797
1901	82, 975	3, 768	378, 184	4, 613	461, 159	8, 381
1904	81, 129	3, 337	355, 316	5, 584	436, 445	8, 921
1908	113, 796	3, 306	312, 515	4, 716	426, 311	8, 022
1920	59, 531	4, 198	471, 219	8, 542	530, 750	12, 740
1925	56. 978	4, 863	276, 228	9, 085	333, 206	13, 948
1929	63, 387	4, 295	211, 286	7, 286	274, 673	11, 581

CATCH OF CERTAIN SPECIES: BY STATES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Alewives [1]			Bluefish			Butterfish [2]		
	Maryland	Virginia	Total	Maryland	Virginia	Total	Maryland	Virginia	Total
1880	9, 204	6, 925	16, 129	10	1, 546	1, 556	(3)	(3)	(3)
1887	11, 062	4, 402	15, 464	383	1, 286	1, 669	(3)	(3)	(3)
1888	11, 512	6, 453	17, 965	576	2, 111	2, 687	(3)	(3)	(3)
1890	19, 767	10, 642	30, 409	460	1, 472	1, 932	30	139	169
1891	17, 419	11, 013	28, 432	516	1, 842	2, 358	32	120	152
1896	17, 667	12, 198	29, 865	(3)	(3)	(3)	(3)	(3)	(3)
1897	17, 139	13, 690	30, 829	187	1, 505	1, 692	87	466	553
1901	13, 747	13, 914	27, 661	100	755	855	472	1, 072	1, 544
1904	14, 485	14, 604	29, 089	91	567	658	375	1, 335	1, 710
1908	28, 805	37, 885	66, 690	14	242	256	151	725	876
1909	23, 637	27, 788	51, 425	(3)	(3)	(3)	(3)	(3)	(3)
1915	12, 568	16, 054	28, 622	(3)	(3)	(3)	(3)	(3)	(3)
1920	7, 072	16, 665	23, 737	74	178	252	876	3, 019	3, 895
1921	6, 505	18, 834	25, 339	(3)	(3)	(3)	(3)	(3)	(3)
1925	7, 701	17, 910	25, 611	58	157	215	280	5, 879	6, 159
1929	5, 924	12, 570	18, 494	212	510	722	911	5, 532	6, 443

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[1] The catch in some of the earlier years does not include that in districts other than the Chesapeake Bay, but the error resulting therefrom is negligible.

[2] Includes harvestfish.

[3] Data not available.

Fisheries of the Chesapeake Bay States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Croaker			Menhaden			Scup or porgy		
	Maryland	Virginia	Total	Maryland	Virginia	Total	Maryland	Virginia	Total
1880	(3)	(3)	(3)	3, 903	88, 214	92, 117	(3)	(3)	(3)
1887	[4] 316	(3)	(3)	23, 630	61, 603	85, 233	----------	----------	-----
1888	[4] 318	(3)	(3)	25, 737	58, 873	84, 610	----------	----------	-----
1890	[4] 273	1, 125	1, 398	27, 970	107, 342	135, 312	----------	----------	-----
1891	[4] 273	1, 076	1, 349	30, 952	105, 980	136, 932	----------	----------	-----
1897	236	4, 162	4, 398	353	178, 656	179, 009	----------	4	4
1901	303	3, 937	4, 240	7, 122	273, 494	280, 616	33	(3)	(3)
1904	166	3, 843	4, 009	9, 849	247, 919	257, 768	32	49	81
1908	179	4, 839	5, 018	12, 293	190, 089	202, 382	(3)	65	(3)
1920	2, 520	16, 372	18, 892	8	366, 379	366, 387	102	35	137
1925	2, 603	22, 649	25, 252	7	150, 486	150, 493	45	402	447
1929	2, 207	14, 414	16, 621	----------	99, 229	99, 229	55	177	232

Year	Sea bass			Shad [1]			Spot		
	Maryland	Virginia	Total	Maryland	Virginia	Total	Maryland	Virginia	Total
1880	(3)	(3)	(3)	3, 774	3, 172	6, 946	(3)	(3)	(3)
1887	209	10	219	4, 041	3. 815	7, 856	(3)	1, 541	(3)
1888	179	10	189	4, 868	7, 057	11, 925	(3)	1, 803	(3)
1890	123	61	184	7, 128	7, 266	14, 394	(3)	651	(3)
1891	113	66	179	6, 225	6, 498	12, 723	(3)	650	(3)
1896	(3)	(3)	(3)	5, 541	11, 171	16, 712	(3)	(3)	(3)
1897	16	2	18	5, 800	11, 529	17, 329	3	1, 081	1, 084
1901	51	2	53	3, 111	6, 972	10, 083	22	807	829
1904	60	1	61	2, 912	7, 420	10, 332	13	873	886
1908	225	63	288	3, 937	7, 314	11, 251	3	192	195
1909	(3)	(3)	(3)	3, 253	6, 030	9, 283	(3)	(3)	(3)
1915	(3)	(3)	(3)	1, 455	4, 714	6, 169	(3)	(3)	(3)
1920	43	19	62	1, 867	7, 294	9, 161	365	967	1, 332
1921	(3)	(3)	(3)	1, 807	6, 909	8, 716	(3)	(3)	(3)
1925	55	51	106	1, 260	6, 104	7, 364	208	1, 768	1, 976
1929	63	31	94	1, 549	7, 977	9, 526	118	872	990

Year	Squeteagues or "sea trout"			Striped bass			White perch		
	Maryland	Virginia	Total	Maryland	Virginia	Total	Maryland	Virginia	Total
1880	65	1, 476	1, 541	(3)	(3)	(3)	(3)	(3)	(3)
1887	532	1, 107	1, 639	1, 140	505	1, 645	996	(3)	(3)
1888	553	1, 111	1, 664	1, 123	779	1, 902	999	(3)	(3)
1890	687	4, 072	4, 759	1, 366	529	1, 895	1, 150	307	1, 457
1891	750	3, 930	4, 680	1, 265	483	1, 748	1, 109	300	1, 409
1897	597	6, 526	7, 123	935	576	1, 511	926	273	1, 199
1901	1, 019	7, 431	8, 450	824	528	1, 352	453	732	1, 185
1904	785	6, 951	7, 736	721	451	1, 172	545	635	1, 180
1908	1, 191	4, 491	5, 682	640	504	1, 144	545	466	991
1920	2, 288	12, 909	15, 197	1, 040	380	1, 420	322	648	970
1925	1, 480	12, 444	13, 924	1, 414	821	2, 235	629	427	1, 056
1929	2, 997	8, 392	11, 389	1, 292	290	1, 582	391	151	542

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[1] The catch in some of the earlier years does not include that in districts other than Chesapeake Bay, but the error resulting therefrom is negligible.

[3] Data not available.

[4] Includes spots.

Fisheries of the Chesapeake Bay States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Yellow perch			Oysters		
	Maryland	Virginia	Total	Maryland	Virginia	Total
1880	(3)	(3)	(3)	74,200	47,861	122,061
1887	1,093	(3)	(3)	57,037	[5] 20,448	77,485
1888	1,099	(3)	(3)	59,722	25,651	85,373
1890	1,370	184	1,554	73,151	42,518	115,669
1891	1,385	169	1,554	69,615	43,135	112,750
1897	396	114	510	50,784	49,167	99,951
1901	293	159	452	39,799	42,474	82,273
1904	265	181	446	31,008	53,286	84,294
1908	359	118	477	43,624	35,525	79,149
1912	(3)	(3)	(3)	38,573	43,443	82,016
1920	310	118	428	31,832	27,745	59,577
1925	232	80	312	29,770	30,495	60,265
1929	141	19	160	17,937	25,177	43,114

Year	Crabs, hard		Crabs, soft		Total crabs		
	Maryland	Virginia	Maryland	Virginia	Maryland	Virginia	Both States
1880	1,167	2,139	(3)	(3)	(3)	(3)	(3)
1887	2,758	627	1,636	(3)	4,394	(3)	(3)
1888	2,675	957	2,209	(3)	4,884	(3)	(3)
1890	2,388	2,585	4,056	440	6,444	3,025	9,469
1891	2,777	2,208	4,829	586	7,606	2,794	10,400
1897	5,333	5,332	4,116	1,068	9,449	6,400	15,849
1901	9,825	6,113	4,303	1,289	14,128	7,402	21,530
1904	12,665	10,356	5,733	1,911	18,398	12,267	30,665
1908	12,786	23,001	7,587	2,082	20,373	25,083	45,456
1915	22,492	18,765	7,602	1,484	30,094	20,249	50,343
1920	5,166	12,465	3,897	1,172	9,063	13,637	22,700
1925	7,321	18,532	2,325	1,423	9,646	19,955	29,601
1929	25,455	30,378	2,645	1,700	28,100	32,078	60,178

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[3] Data not available.
[5] Exclusive of the James and Potomac Rivers.

SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The shad and alewife fisheries of the Potomac River were prosecuted by 608 fishermen in 1930 or 21 per cent less than in 1929. These fishermen used 440 motor and other small boats, 405 pound nets, 698 gill nets having a combined area of 343,902 square yards, and 1 haul seine having a length of 100 yards.

The catch of shad amounted to 175,150 in number, with a weight of 601,193 pounds, valued at $98,041 to the fishermen. This is a decrease of 43 per cent in the weight of the catch as compared with that for the previous year, and is less in weight than the catch for any year for which there are records since 1896, except 1924. The average price per pound as received by the fishermen increased from 13.5 cents per pound in 1929 to 16.3 cents per pound in 1930. More than nine-tenths of the catch was made by Virginia fishermen and was taken largely by pound nets in Northumberland County. The catch by Maryland fishermen was taken chiefly by gill nets in Charles County and by pound nets in St. Marys County.

The catch of roe shad amounted to 47 per cent of the total number of shad taken. In 1929 the catch of roe shad amounted to 54 per cent of the total number.

The collection of shad eggs at the bureau's hatchery at Fort Humphreys amounted to less than 3,000,000 eggs in 1930, while during 1929, this station hatched 65,851,000 shad. The unsuccessful egg collecting operations are attributed to the light run of shad brought about by drought and low-water conditions, which caused greater saline conditions farther up into the spawning grounds.

The catch of alewives amounted to 7,785,500 in number, with a weight of 3,114,918 pounds, valued at $49,315. This is an increase of 1 per cent in the weight of the catch as compared with that for 1929, but is smaller than any other catch on record since that for 1915. The amount of the catch in 1915 was but little less than that made in 1930. The average price per pound as received by the fishermen decreased from 1.8 cents per pound in 1929 to 1.6 cents per pound in 1930. Nearly nine-tenths of the catch was made by Virginia fishermen, largely in Northumberland County. The catch by Maryland fishermen was made chiefly in St. Marys County. By far the larger part of the catch in both States was taken by pound nets.

Shad and alewife fisheries of the Potomac River, 1930

Items	Maryland			Virginia			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Fishermen	172	-------	-------	436	-------	-------	608	-------	-------
Motorboats	70	-------	-------	164	-------	-------	234	-------	-------
Rowboats	49	-------	-------	157	-------	-------	206	-------	-------
Pound nets	75	-------	-------	330	-------	-------	405	-------	-------
Gill nets	403	-------	-------	295	-------	-------	698	-------	-------
Square yards	212, 070	-------	-------	131, 832	-------	-------	343, 902	-------	-------
Haul seines	1	-------	-------	-------	-------	-------	1	-------	-------
Length, yards	100	-------	-------	-------	-------	-------	100	-------	-------
Shad caught:									
With pound nets	7, 355	25, 517	$4, 379	151, 918	523, 023	$85, 086	159, 273	548, 540	$89, 465
With gill nets	7, 440	24, 791	4, 009	8, 425	27, 825	4, 562	15, 865	52, 616	8, 571
With haul seines	12	37	5	-------	-------	-------	12	37	5
Total	14, 807	50, 345	8, 393	160, 343	550, 848	89, 648	175, 150	601, 193	98, 041
Alewives caught:									
With pound nets	834, 000	333, 600	5, 788	6, 948, 300	2, 780, 118	43, 497	7, 782, 300	3, 113, 718	49, 285
With gill nets	3, 000	1, 200	30	-------	-------	-------	3, 000	1, 200	30
Total	837, 000	334, 800	5, 818	6, 948, 300	2, 780, 118	43, 497	7, 785, 300	3, 114, 918	49, 315

Catch of alewives in the Potomac River for various years, 1896 to 1930

Year	Maryland			Virginia			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
1896 [1]	-------	-------	-------	-------	-------	-------	24, 437, 885	9, 775, 154	$39, 003
1909	4, 883, 000	1, 953, 200	$10, 369	24, 601, 040	9, 840, 416	$42, 854	29, 484, 040	11, 793, 616	53, 223
1915	335, 000	134, 000	1, 420	7, 276, 428	2, 910, 571	30, 741	7, 611, 428	3, 044, 571	32, 161
1919	1, 488, 583	772, 867	15, 508	7, 379, 319	2, 904, 054	45, 508	8, 867, 902	3, 676, 921	61, 016
1920	1, 077, 775	538, 888	13, 940	7, 681, 561	3, 813, 780	41, 197	8, 759, 336	4, 352, 668	55, 137
1921	1, 395, 000	558, 000	9, 010	8, 908, 510	3, 563, 404	35, 031	10, 303, 510	4, 121, 404	44, 041
1922	1, 292, 500	517, 000	3, 700	10, 074, 500	4, 029, 800	34, 642	11, 367, 000	4, 546, 800	38, 342
1923	2, 119, 787	847, 916	8, 764	9, 308, 782	3, 722, 912	40, 657	11, 428, 569	4, 570, 828	49, 421
1924	1, 834, 000	733, 600	6, 855	13, 299, 388	5, 319, 156	49, 667	15, 133, 388	6, 052, 756	56, 552
1925	415, 000	166, 000	2, 070	7, 420, 380	2, 968, 152	35, 271	7, 835, 380	3, 134, 152	37, 341
1926	1, 295, 020	518, 600	6, 518	12, 500, 828	5, 000, 330	48, 848	13, 795, 848	5, 518, 930	55, 366
1927	1, 272, 000	508, 699	5, 741	10, 336, 067	4, 136, 666	44, 847	11, 608, 067	4, 645, 365	50, 588
1928	1, 801, 475	720, 590	9, 565	12, 982, 180	5, 182, 472	48, 732	14, 783, 655	5, 903, 062	58, 297
1929	884, 000	353, 600	7, 075	6, 827, 030	2, 730, 812	47, 841	7, 711, 030	3, 084, 412	54, 916
1930	837, 000	334, 800	5, 818	6, 948, 300	2, 780, 118	43, 497	7, 785, 300	3, 114, 918	49, 315

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[1] Data for the two States not enumerated separately.

Catch of shad in the Potomac River for various years, 1896 to 1930

Year	Maryland			Virginia			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
1896	233, 238	874, 643	$20, 524	450, 825	1, 690, 594	$43, 084	684, 063	2, 565, 237	$63, 608
1901	146, 000	547, 500	14, 800	648, 462	2, 431, 733	104, 566	794, 462	2, 979, 233	119, 366
1904	83, 147	311, 801	16, 343	289, 500	1, 085, 625	51, 709	372, 647	1, 397, 426	68, 052
1909	31, 158	116, 843	9, 232	172, 813	648, 049	44, 500	203, 971	764, 892	53, 732
1915	17, 196	64, 485	6, 827	165, 206	619, 523	65, 300	182, 402	684, 008	72, 127
1919	94, 512	354, 420	56, 833	449, 957	1, 687, 339	275, 564	544, 469	2, 041, 759	332, 397
1920	80, 944	302, 237	55, 963	448, 414	1, 677, 543	278, 501	529, 358	1, 979, 780	334, 464
1921	49, 681	138, 207	25, 191	356, 191	1, 022, 231	182, 179	405, 872	1, 160, 438	207, 370
1922	203, 682	706, 501	95, 140	680, 494	2, 409, 070	324, 882	884, 176	3, 115, 571	420, 022
1923	93, 619	308, 729	52, 917	257, 927	878, 653	145, 702	351, 546	1, 187, 382	198, 619
1924	37, 505	127, 285	20, 469	134, 805	450, 925	67, 981	172, 310	578, 210	88, 450
1925	46, 008	157, 786	35, 310	158, 574	538, 846	128, 088	204, 582	696, 632	163, 398
1926	51, 601	162, 861	34, 808	285, 061	871, 345	182, 653	336, 662	1, 034, 206	217, 461
1927	30, 720	103, 728	17, 894	191, 601	582, 853	95, 931	222, 321	686, 581	113, 825
1928	138, 496	383, 126	37, 588	577, 924	1, 694, 496	177, 099	716, 420	2, 077, 622	214, 687
1929	68, 613	225, 797	22, 676	248, 640	826, 487	118, 913	317, 253	1, 052, 284	141, 589
1930	14, 807	50, 345	8, 393	160, 343	550, 848	89, 648	175, 150	601, 193	98, 041

NOTE.—The number of shad taken in the Potomac River in 1878 was 186,000; in 1880, 552,872; in 1889, 868,900; in 1890, 731,453; and in 1891, 621,977.

TRADE IN FRESH, FROZEN, AND SMOKED FISHERY PRODUCTS IN WASHINGTON, D. C.

The municipal fish wharf and market in Washington, D. C., was built about 14 years ago in the southwestern part of the city on an arm of the Potomac River. At the present time 18 fishery firms have stalls in this market. In addition four are located across the street from the market, and six elsewhere in the city. About one-half of the firms sell at wholesale exclusively, although each of the remaining establishments engages more or less in wholesaling fish in addition to selling at retail. Altogether the 28 above firms employed 136 persons, who received $181,787 in salaries and wages. Of the total employees, 78 were regularly employed by those firms at the municipal fish wharf.

The municipal fish market is so situated that fishing boats may land their fish directly, although only about 10 per cent of the fish are received in this way. The greater part are received by truck from New Jersey, North Carolina, Maryland, and Virginia, the bulk of these arrivals coming from the latter two States. Fish arriving from the Atlantic coast, Gulf, Pacific coast, or the Great Lakes States by rail are transported by truck from the rail terminals to the markets, as they have no direct rail connections.

Some of the fish from the vessels, boats, and trucks are sold at auction direct to the dealers. Several of the wholesalers also sell fish by auction to retail merchants and hucksters. However, the greater part of the business in the market, of both buying and selling, is transacted at a set price.

During 1930 the receipts of fresh and frozen fishery products at the municipal wharf amounted to 8,926,026 pounds. This is a decrease of a little more than 3 per cent as compared with the receipts during 1929. However, it is an increase of approximately 12 per cent compared with the average receipts during the past five years. It is estimated that 3,000,000 pounds of fresh and frozen fishery products entered the District of Columbia direct from outside sources through hotels, restaurants, fish markets, and grocery stores. This, added to the amount received at the municipal fish wharf, would make a total of nearly 12,000,000 pounds of fresh and frozen fishery products handled in the District of Columbia by all dealers during 1930. Virtually the entire amount was consumed in the district. However, a few hucksters from towns in Virginia and Maryland, bringing poultry and other products to market, buy fish here and sell them on their return trip. Some of these hucksters go as far as Pennsylvania and West Virginia towns.

There has been very little change in the kind of fish handled in the municipal market in the past 10 years. Taking those species which constituted 75 per cent of the trade for the various years from 1921 to 1930, squeteagues or "sea trout" are the most important each year. Croaker has usually been second, river herring third, and oysters fourth. In 1930 the first three species mentioned held their places, and crabs and crab meat moved up to fourth place, with haddock fifth, oysters sixth, and shad seventh.

The trade at municipal fish wharf is most active during the months from March to November, the largest quantities being handled during the months of April and May. The unusual activity during these latter months can be accounted for chiefly by the large amount of river herring, croaker, and shad, which are handled during these two months.

There is one public cold-storage warehouse in Washington which makes a practice of storing frozen fishery products. This is located directly across the street from the municipal fish market, and stores considerable quantities of the frozen fish sold through the market. This warehouse has direct rail connection with the main lines of the railroads.

During 1930 three firms in Washington, D. C., smoked fishery products. Their production amounted to 486,500 pounds, valued at $48,410. Of this amount 454,000 pounds, valued at $39,240, consisted of herring, and 32,500 pounds, valued at $9,170, of whitefish. Most of these products were marketed in the city.

The retail fish business in the District of Columbia is carried on by stores in the municipal market, retail fish markets, uptown grocery stores, meat markets, and fish peddlers. There are about 40 fish peddlers in the city who devote their entire time to selling fish, about 25 with horse and wagon and 15 with automobile trucks. This number greatly increases during April and May, when the season for shad, croaker, and river herring is at its highest. The number of fish peddlers slightly increased during the year 1930, which was due possibly to lack of employment in other lines. A large number of markets and grocery stores selling fish at retail now dress them for their customers and also sell large quantities of packaged fish. This has a tendency to decrease the number of fish peddlers since these latter do not make a practice of dressing the fish they market.

The population of the District of Columbia on April 1, 1930, according to figures collected by the United States Bureau of the Census, was 486,869. The total consumption of fresh and frozen fishery products, in round weight, and smoked fishery products, as prepared, is estimated to be about 12,000,000 pounds in the city, making the per capita consumption of these products about 24 pounds annually.

Fishery products received at municipal fish wharf and market, Washington, D. C., 1930, in pounds

Species	January	February	March	April	May	June	July
Bass, black or sea	2, 100	4, 000	5, 900	3, 200	600	3, 000	2, 800
Bluefish	1, 300	300	800	2, 700	13, 200	14, 500	9, 700
Butterfish	6, 300	6, 700	13, 600	4, 400	35, 200	68, 400	36, 600
Carp	11, 710	20, 800	7, 200	17, 500	4, 800	13, 000	5, 200
Catfish	8, 500	16, 700	16, 300	20, 200	5, 600	16, 000	1, 600
Cod	1, 100	1, 800	5, 500	4, 400	1, 100	900	500
Crappie	200						
Croaker	53, 100	62, 600	49, 100	237, 640	229, 800	186, 300	265, 900
Eels			500	1, 700	800	800	
Flounders	47, 000	27, 800	34, 800	41, 100	19, 700	7, 900	6, 100
Gizzard shad	6, 200	8, 800	1, 900	500			
Haddock	54, 020	47, 550	79, 620	74, 330	37, 110	34, 520	26, 840
Hake	500		400	1, 400			
Halibut	7, 600	3, 000	3, 600	3, 800	3, 000	3, 700	2, 600
Herring, river	28, 400	61, 200	215, 000	499, 800	112, 200	600	
Herring roe, river				2, 060	400		
Hickory shad or "jacks"	11, 400	2, 500	1, 200	1, 100	900		
Kingfish	300	200		2, 900			200
Mackerel	30, 000	16, 600	19, 800	15, 100	19, 100	28, 900	26, 200
Menhaden	200						
Mullet	2, 500	1, 200	200	400			100
Perch	11, 500	24, 700	22, 400	27, 100	3, 200	5, 500	1, 100
Pike or pickerel	1, 600	1, 850	1, 000	200	100	400	100
Pollock	1, 400	2, 300	1, 100	2, 100	300	200	1, 300
Pompano							100
Redfish or red drum	300				160	60	
Red snapper	800	600	400	1, 135	1, 020	1, 310	750
Salmon	1, 500	1, 500	1, 500		400	2, 300	1, 300
Scup or porgy		400	1, 600		5, 100	6, 000	900
Shad	24, 800	19, 100	98, 975	198, 000	60, 100	2, 000	
Sheepshead	200						
Smelt	2, 430	2, 290	305				
Spot	3, 600	6, 800	1, 700	1, 500	4, 100	17, 500	23, 000
Squeteagues or "sea trout"	77, 800	62, 200	70, 700	66, 900	309, 200	290, 700	192, 400
Squeteague roe					50		
Squid			200	300	600		
Striped bass	5, 200	4, 900	40, 100	43, 200	12, 400	8, 800	7, 200
Sturgeon				187		150	
Swordfish	100					750	1, 150
Tilefish	900	800	1, 100	1, 500	200	200	300
Clams, hard (meat)	4, 777	3, 104	4, 480	4, 768	7, 328	8, 000	5, 568
Oysters:							
In the shell (meat)	17, 661	17, 829	11, 585	4, 606	280		
Opened (meat)	57, 956	41, 547	23, 810	11, 575	305		
Scallops (meat)				600	1, 200	880	1, 040
Crabs				2, 505	43, 725	95, 775	116, 595
Crabmeat	1, 200	1, 350	1, 910	6, 705	15, 880	26, 620	24, 775
Crawfish or spiny lobster			50				
Crawfish or spiny lobster meat	50			100			
Lobster	50	150	1, 650	1, 850	850	600	450
Shrimp	2, 900	2, 600	3, 700	6, 500	12, 100	8, 700	7, 000
Turtles	1, 144	80	200	1, 548	12	16	320
Frogs			140	90	212	130	
Total	490, 298	475, 850	744, 025	1, 317, 199	962, 332	855, 111	769, 688

Species	August	September	October	November	December	Total
Bass, black or sea	300	1, 500	700	1, 200	2, 000	27, 300
Bluefish	11, 500	47, 200	53, 800	11, 500	2, 900	169, 400
Butterfish	25, 100	19, 900	11, 900	5, 400	2, 000	235, 500
Carp	2, 800	8, 500	3, 500	2, 400	6, 900	104, 310
Catfish	600	7, 600	9, 000	4, 400	7, 700	114, 200
Cod	600	300		400	900	17, 500
Crappie						200
Croaker	264, 800	152, 600	57, 400	46, 300	73, 900	1, 679, 440
Eels		300	800	400	1, 000	6, 300
Flounders	22, 800	15, 200	21, 900	15, 400	32, 500	292, 200
Gizzard shad		900	2, 200	2, 600	10, 600	33, 700
Haddock	20, 250	23, 650	43, 800	26, 190	31, 140	499, 020
Hake				27, 600	33, 000	62, 900
Halibut	2, 800	4, 400	5, 800	3, 900	6, 100	50, 300
Herring, river			200			917, 400
Herring roe, river						2, 460
Hickory shad or "jacks"						17, 100
Kingfish		400	200	1, 600		5, 800
Mackerel	12, 000	17, 365	18, 100	14, 200	18, 300	235, 665
Menhaden				3, 300	100	3, 600
Mullet		900	5, 900	4, 200	2, 000	17, 400

Fishery products received at municipal fish wharf and market, Washington, D. C., 1930, in pounds—Continued

Species	August	September	October	November	December	Total
Perch	4,600	4,500	3,800	5,200	8,900	122,500
Pigfish		300				300
Pike or pickerel		800	600	400	1,700	8,750
Pollock	1,600	1,500	2,100	700	1,200	15,800
Pompano					200	300
Redfish or red drum		75	800	200	1,300	2,895
Red snapper	200	200	600	500	500	8,015
Salmon	1,800	2,400	4,600	4,100	2,200	23,600
Scup or porgy			1,600	300	200	16,100
Shad						402,975
Sheepshead		100			200	500
Smelt				100	6,035	11,160
Spot	18,700	16,700	61,800	4,600		160,000
Squeteagues or "sea trout"	263,700	348,200	378,800	112,300	105,800	2,278,700
Squeteague roe						50
Squid			300		500	1,900
Striped bass	10,900	4,500	20,100	16,400	6,500	180,200
Sturgeon		100	190			627
Swordfish	575	320			50	2,945
Tilefish	200		200	600	1,300	7,300
Whitefish		700	100	200		1,000
Whiting				1,300		1,300
Clams, hard (meat)	5,024	5,088	4,960	2,784	3,520	[1] 59,401
Oysters:						
In the shell (meat)	42	2,877	21,826	21,287	32,592	[2] 130,585
Opened (meat)		6,006	58,245	68,822	92,631	[3] 360,897
Scallops (meat)	560	320	320	400	480	5,800
Crabs	80,025	67,995	8,145		75	414,840
Crabmeat	21,185	14,900	6,720	3,190	1,935	126,370
Crawfish or spiny lobster						50
Crawfish or spiny lobster meat				25		175
Lobster	300	700	900	400	350	8,250
Shrimp	5,600	12,400	6,000	4,600	4,100	76,200
Turtles	4		800		120	4,244
Frogs	30					602
Total	778,595	791,396	818,706	419,398	503,428	8,926,026

[1] 7,425 bushels. [2] 18,655 bushels. [3] 43,745 gallons.

NOTE.—The clams have been reduced to pounds on the basis of 8 pounds of meat to a bushel, and the oysters on the basis of 7 pounds of meat to a bushel and 8¼ pounds to a gallon.

Fishery products received at municipal fish wharf and market, Washington, D. C., 1921 to 1930

Year	Pounds	Year	Pounds
1921	9,066,744	1926	7,511,427
1922	6,442,663	1927	7,997,673
1923	5,678,157	1928	8,198,957
1924	8,007,704	1929	9,208,465
1925	7,041,058	1930	8,926,026

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

In the years for which there are records, the value of the catch of fishery products in the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) during 1929 was exceeded only in 1927 and 1928. These fisheries gave employment to 26,643 fishermen or 7 per cent less than in 1928. Of the total number of fishermen employed during 1929, 3,298 regular fishermen were engaged on vessels, and 17,235 regular and 6,110 casual fishermen were employed in the shore and boat fisheries. Their catch amounted to 535,395,859 pounds, valued at $14,903,945. This is an increase of 18 per cent in the catch and a decrease of 7 per cent in the value of the catch as compared with the catch and its value for 1928. Of the total catch in 1929, 375,962,766 pounds, valued at $7,401,812, were fish, and 159,432,093 pounds, valued at $7,502,133, were shellfish and miscellaneous products.

Based on the value to the fishermen, shrimp with a production of 108,550,538 pounds, valued at $4,435,366, was the most important product. Oysters were second with a production of 41,805,187 pounds of meats, valued at $1,691,257. Other products of importance were mullet, 33,660,810 pounds, valued at $1,328,065; menhaden, 253,234,620 pounds, valued at $1,143,706; sponges of all varieties, 528,721 pounds, valued at $879,646; squeteagues or "sea trout," 11,330,377 pounds, valued at $875,355; red and mangrove snapper, 10,236,214 pounds, valued at $830,809; and shad, 3,346,409 pounds, valued at $619,605. Other products were valued individually at less than $400,000.

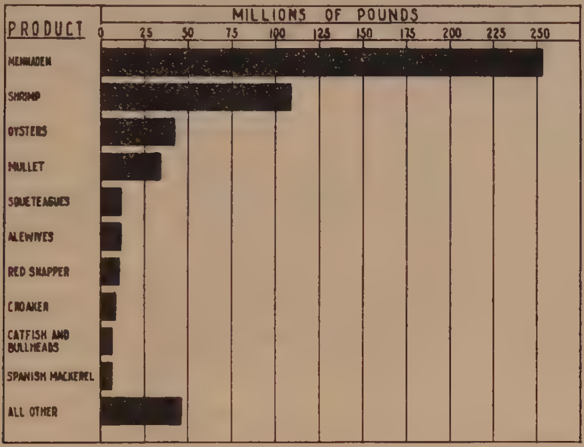

FIGURE 19.—Yield of principal fishery products in the South Atlantic and Gulf States, 1929

The industries related to the fisheries of the South Atlantic and Gulf States gave employment to 9,816 persons, of whom 757 were engaged in transporting fishery products, 3,394 were in the wholesale trade and received $1,835,556 in salaries and wages, 4,908 were in the manufacturing industry and received $2,319,890 in salaries and wages, and 757 were fishermen who prepared fishery products and are duplicated in the total number of fishermen employed as shown above. Of the persons in transporting craft, 308 also have been included as fishermen. There were 498 establishments in the wholesale trade handling primary products, and 174 establishments were in the manufacturing industry. The latter manufactured products valued at $13,341,563, consisting principally of canned shrimp and oysters, and oyster shell and menhaden products. In addition, the fishermen prepared fishery products valued at $107,871. Most of these products were salt fish prepared from mullet and alewives.

Fisheries of the South Atlantic and Gulf States, 1929

SUMMARY OF CATCH

Products	North Carolina		South Carolina		Georgia	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	210, 297, 205	$2, 080, 180	1, 150, 518	$124, 464	30, 338, 169	$263, 632
Shellfish, etc	7, 298, 088	463, 827	4, 984, 615	150, 654	13, 175, 472	613, 600
Total	217, 595, 293	2, 544, 007	6, 135, 133	275, 118	43, 513, 641	877, 232

Products	Florida		Alabama		Mississippi	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	122, 177, 203	$4, 013, 600	4, 120, 757	$233, 644	1, 591, 706	$91, 827
Shellfish, etc	23, 775, 875	2, 106, 347	4, 903, 782	176, 681	33, 037, 450	913, 474
Total	145, 953, 078	6, 119, 947	9, 024, 539	410, 325	34, 629, 156	1, 005, 301

Products	Louisiana		Texas		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	1, 741, 966	$171, 644	4, 545, 242	$422, 821	375, 962, 766	$7, 401, 812
Shellfish, etc	60, 177, 939	2, 593, 029	12, 078, 872	484, 521	159, 432, 093	7, 502, 133
Total	61, 919, 905	2, 764, 673	16, 624, 114	907, 342	535, 394, 859	14, 903, 945

OPERATING UNITS: BY STATES

Items	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1, 032	42	147	909	179	606	228	155	3, 298
On boats and shore—									
Regular	2, 544	300	355	7, 248	545	1, 681	3, 078	1, 484	17, 235
Casual	2, 399	1, 229	678	846	57	160	403	338	6, 110
Total	5, 975	1, 571	1, 180	9, 003	781	2, 447	3, 709	1, 977	26, 643
Vessels:									
Motor	80	10	26	106	34	124	103	41	524
Net tonnage	1, 883	112	349	3, 345	379	1, 667	741	485	8, 961
Sail	64	--------	--------	8	4	14	--------	--------	90
Net tonnage	567	--------	--------	552	51	218	--------	--------	1, 388
Total vessels	144	10	26	114	38	138	103	41	614
Total net tonnage	2, 450	112	349	3, 897	430	1, 885	741	485	10, 349
Boats:									
Motor	1, 438	38	167	2, 855	212	426	1, 197	504	6, 837
Other	2, 308	1, 004	514	3, 718	237	758	1, 108	868	10, 515
Accessory boats	137	--------	10	42	--------	--------	--------	--------	189
Apparatus:									
Purse seines—									
Menhaden	46	--------	3	18	--------	--------	--------	--------	67
Length, yards	18, 415	--------	1, 500	5, 523	--------	--------	--------	--------	25, 438
Other	2	--------	--------	2	--------	--------	--------	--------	4
Length, yards	375	--------	--------	600	--------	--------	--------	--------	975
Haul seines—									
Common	493	30	16	169	9	15	200	134	1, 066
Length, yards	81, 016	4, 188	1, 603	66, 920	7, 000	4, 087	33, 824	28, 508	227, 146
Long	59	--------	--------	87	--------	--------	--------	78	224
Length, yards	60, 540	--------	--------	69, 700	--------	--------	--------	14, 166	144, 406
Gill nets—									
Anchor	2, 370	277	122	8	--------	--------	--------	112	2, 889
Square yards	1, 398, 142	70, 765	34, 694	2, 400	--------	--------	--------	27, 300	1, 533, 301
Drift	89	149	179	216	--------	--------	--------	6	639
Square yards	178, 938	145, 250	242, 881	404, 000	--------	--------	--------	2, 400	973, 469
Runaround	552	27	39	2, 574	--------	--------	--------	--------	3, 192
Square yards	241, 082	13, 010	13, 824	3, 230, 365	--------	--------	--------	--------	3, 498, 281
Set	--------	--------	--------	--------	--------	--------	--------	295	295
Square yards	--------	--------	--------	--------	--------	--------	--------	52, 612	52, 612
Stake	10, 946	--------	--------	60	20	--------	--------	--------	11, 026
Square yards	631, 776	--------	--------	3, 900	3, 000	--------	--------	--------	638, 676
Trammel nets	--------	--------	--------	142	126	59	72	113	512
Square yards	--------	--------	--------	117, 642	37, 672	25, 905	29, 605	50, 204	261, 028

Fisheries of the South Atlantic and Gulf States, 1929—Continued

OPERATING UNITS: BY STATES—Continued

Items	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Apparatus—Continued.									
Lines—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Hand	156	244	8	1, 923	148	143	81	522	3, 225
Hooks	516	1, 032	16	3, 124	262	143	86	637	5, 816
Troll	102			1, 756				146	2, 004
Hooks	102			2, 699				146	2, 947
Trot with baits or snoods	116	11	137	9	30	124	330	16	773
Baits or snoods	83, 720	5, 500	1, 882	2, 350	5, 650	48, 430	53, 605	9, 200	210, 337
Trot with hooks	69			274	171		14	46	574
Hooks	314			112, 600	17, 100		1, 900	6, 480	138, 394
Pound nets	2, 738			47					2, 785
Wheels	20								20
Stop nets				1					1
Square yards				2, 000					2, 000
Fyke nets	678		50	2, 980	110				3, 818
Dip nets—									
Common	468	10		125				114	717
Drop						320	1, 633		1, 953
Cast nets			40	34		50		8	132
Otter trawls—									
Fish	1								1
Yards at mouth	15								15
Shrimp	52	24	167	386	140	394	1, 013	219	2, 395
Yards at mouth	809	482	3, 546	7, 461	1, 816	5, 008	12, 383	2, 162	34, 667
Wire baskets				550					550
Crab traps			25						25
Turtle traps	25								25
Pots—									
Crab				3, 814				75	3, 889
Eel	1, 423			100					1, 523
Sea crawfish				2, 794					2, 794
Spears	121	30		57	42	97		182	529
Dredges—									
Clam				1					1
Crab	453								453
Yards at mouth	398								398
Oyster	204	1			14	394	20	29	662
Yards at mouth	224	1			14	391	20	29	679
Scallop	703								703
Yards at mouth	630								630
Tongs	598	32	81	440	92	513	729	383	2, 868
Rakes	1, 246	51	5						1, 302
Forks				61					61
Crabs	20	515	106						641
Hooks—									
Sea crawfish and stone crab				132					132
Sponge				278					278
Diving apparatus				51					51

CATCH: BY STATES

Species	North Carolina		South Carolina		Georgia	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	10, 767, 457	$102, 223				
Black bass	84, 495	12, 354				
Bluefish	631, 166	48, 328			27, 567	$5, 238
Bonito	1, 100	62				
Bowfin	24, 567	460				
Butterfish	76, 070	1, 853				
Carp	527, 088	36, 804				
Catfish and bullheads	399, 412	16, 699	1, 125	$45	240, 000	9, 600
Cero	17, 420	1, 085				
Crappie	4, 230	295				
Crevalle			375	30		
Croaker	7, 679, 391	116, 567	6, 000	300	15, 050	705
Drum:						
Black	800	40	437	35		
Red or redfish	195, 075	3, 348	10, 525	615	4, 250	350
Eels	106, 953	6, 644				
Flounders	725, 259	47, 511	25, 399	2, 415	2, 660	198
Gizzard shad	54, 940	361				
Groupers					8, 275	496
Grunts	11, 584	657	6, 374	510		

Fisheries of the South Atlantic and Gulf States, 1929—Continued

CATCH: BY STATES—Continued

Species	North Carolina		South Carolina		Georgia	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Harvestfish or "starfish"	616,073	$14,029				
Hickory shad	319,395	17,557	4,900	$426	50,405	$7,549
Jewfish					1,473	74
King whiting or "kingfish"	387,168	15,191	100,754	10,000	51,500	1,265
Menhaden	173,489,840	718,515			29,212,800	107,674
Mullet	2,568,408	123,727	336,529	20,990	121,663	6,300
Pigfish	174,851	3,316	500	50		
Pike	16,027	1,806				
Pinfish or sailors choice	10,599	443	2,062	185		
Pompano	12,399	1,096				
Porgies	1,714	120	250	20		
Sea bass	260,658	$20,354	270,499	$21,865	41,988	$3,747
Shad	1,913,265	350,424	260,111	55,616	471,807	112,262
Sheepshead, salt-water	23,346	1,422	250	20	1,275	105
Snapper:						
Mangrove	3,466	312				
Red	15,180	1,291			32,983	2,804
Spadefish	17,711	933				
Spanish mackerel	141,681	14,024				
Spot	3,309,665	80,528	38,100	1,955	11,850	578
Squeteagues or "sea trout"	5,090,281	254,593	68,019	5,490	37,757	3,899
Squirrelfish	1,130	34	437	35		
Striped bass	246,357	41,224				
Sturgeon	1,617	366	17,872	3,862	4,866	803
Suckers	153	11				
Sunfish	33,567	636				
Tautog	538	43				
Tenpounder	2,500	50				
White perch	221,436	15,439				
Yellow perch	102,173	7,270				
Yellowtail	9,000	135				
Total	210,297,205	2,080,180	1,150,518	124,464	30,338,169	263,632
SHELLFISH, ETC.						
Crabs:						
Hard	854,600	15,170	60,000	1,800	225,000	5,813
Soft	351,340	52,620				
Shrimp	897,495	30,560	287,711	16,625	12,377,619	581,015
Squid	1,790	143				
Clams, hard	380,336	59,843	20,200	2,665	1,800	280
Oysters:						
Market, public	3,570,425	243,029	3,706,252	98,607	192,122	6,539
Market, private	16,338	2,504	901,859	27,054	358,743	13,431
Seed, public	523,012	19,117				
Scallops, bay	686,220	37,960				
Octopus			937	75		
Terrapin	7,262	2,597	7,656	3,828	20,188	6,522
Turtles	9,270	284				
Total	7,298,088	463,827	4,984,615	150,654	13,175,472	613,600
Grand total	217,595,293	2,544,007	6,135,133	275,118	43,513,641	877,232

Species	Florida		Alabama		Mississippi	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	587	$70				
Alewives	408,229	4,101				
Amberjack	44,102	1,531				
Barracuda	17,360	521				
Black bass	424,496	42,040				
Bluefish	1,122,202	106,716	103,450	$5,700	15,831	$1,157
Blue runner or hardtail	802,479	14,219	7,698	223	1,221	35
Bonito	8,535	265				
Buffalofish			64,077	3,528		
Cabio or crab eater	9,904	303			4,823	154
Catfish and bullheads	5,256,081	236,860	111,678	8,569	91,678	3,147
Cero	14,800	642				
Cigarfish	89,100	2,673				
Crappie	1,003,530	39,587				
Crevalle	244,125	7,393	23,213	743	2,497	90
Croaker	71,685	2,149	38,059	1,378	59,300	1,970
Dolphin	5,000	500				

Fisheries of the South Atlantic and Gulf States, 1929—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued						
Drum:						
Black	83, 489	$2, 380	23, 723	$1, 201	13, 757	$774
Red or redfish	1, 208, 755	48, 242	104, 718	9, 106	128, 868	10, 848
Eels	19, 618	981	----------	----------	----------	----------
Flounders	124, 040	8, 332	32, 059	3, 084	61, 078	7, 693
Groupers	4, 145, 290	127, 558	154, 006	4, 882	24, 930	657
Grunts	71, 173	2, 638	----------	----------	----------	----------
Hickory shad	41, 251	1, 238	----------	----------	----------	----------
Hogfish	3, 600	108	----------	----------	----------	----------
Jewfish	87, 503	4, 688	150	6	1, 353	37
Kingfish or "king mackerel"	4, 335, 898	226, 309	----------	----------	302	26
King whiting or "kingfish"	664, 943	22, 050	1, 896	57	32, 588	989
Menhaden	50, 531, 980	317, 512	----------	----------	----------	----------
Mojarro	549, 978	22, 151	----------	----------	----------	----------
Mconfish	110	3	----------	----------	----------	----------
Mullet	27, 925, 123	1, 075, 512	2, 025, 764	73, 927	600, 832	23, 723
Muttonfish	225, 632	18, 510	----------	----------	----------	----------
Paddlefish or spoonbill cat	----------	----------	3, 068	278	----------	----------
Permit	17, 796	566	----------	----------	----------	----------
Pigfish	121, 928	2, 985	----------	----------	1, 115	42
Pinfish or sailors choice	139, 070	3, 090	----------	----------	----------	----------
Pompano	482, 058	102, 896	1, 515	339	902	177
Porgies	158, 483	4, 696	----------	----------	----------	----------
Porkfish	500	15	----------	----------	----------	----------
Sea bass	88, 853	7, 191	----------	----------	3, 883	423
Shad	701, 226	101, 303	----------	----------	----------	----------
Sharks	176, 000	2, 200	----------	----------	----------	----------
Sheepshead, salt-water	960, 269	38, 029	46, 837	4, 182	38, 299	3, 052
Snapper:						
Mangrove	263, 256	14, 139	----------	----------	----------	----------
Red	7, 718, 724	619, 646	1, 227, 601	102, 176	90, 864	7, 194
Snook or sergeantfish	580, 196	24, 229	----------	----------	----------	----------
Spadefish	79, 262	2, 409	1, 293	50	550	30
Spanish mackerel	5, 965, 091	366, 904	9, 872	747	1, 505	146
Spot	276, 240	8, 490	7, 129	250	28, 849	925
Squeteagues or "sea trout"	3, 931, 258	340, 036	128, 305	12, 280	383, 937	28, 396
Sturgeon	13, 183	2, 137	2, 850	810	----------	----------
Sunfish	503, 967	15, 109	870	87	----------	----------
Tenpounder	278, 645	5, 637	----------	----------	----------	----------
Tripletail	10, 150	406	926	41	2, 744	142
Turbot	200	6	----------	----------	----------	----------
Yellowtail	170, 250	12, 699	----------	----------	----------	----------
Total	122, 177, 203	4, 013, 600	4, 120, 757	233, 644	1, 591, 706	91, 827
SHELLFISH, ETC.						
Crabs:						
Hard	123, 224	3, 588	103, 228	2, 604	1, 247, 166	33, 103
Soft	----------	----------	3, 600	850	12, 052	3, 984
Stone	226, 660	22, 810	----------	----------	----------	----------
Sea crawfish or spiny lobster	413, 266	36, 681	----------	----------	----------	----------
Shrimp	18, 618, 564	879, 192	4, 396, 400	154, 139	13, 101, 450	421, 491
Clams, hard	746, 040	51, 349	----------	----------	----------	----------
Oysters:						
Market, public	2, 819, 838	213, 021	299, 124	8, 152	18, 610, 082	450, 906
Market, private	241, 780	10, 640	100, 800	10, 800	64, 400	2, 880
Scallops, bay	24, 094	7, 687	----------	----------	----------	----------
Terrapin	----------	----------	530	127	2, 300	1, 110
Turtles	27, 488	1, 299	100	8	----------	----------
Sponges:						
Grass	85, 163	22, 234	----------	----------	----------	----------
Sheepswool	321, 884	808, 622	----------	----------	----------	----------
Wire	11, 060	4, 424	----------	----------	----------	----------
Yellow	110, 614	44, 366	----------	----------	----------	----------
Conchs	6, 200	434	----------	----------	----------	----------
Total	23, 775, 875	2, 106, 347	4, 903, 782	176, 681	33, 037, 450	913, 474
Grand total	145, 953, 078	6, 119, 947	9, 024, 539	410, 325	34, 629, 156	1, 005. 301

Fisheries of the South Atlantic and Gulf States, 1929—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore					587	$70
Alewives					11, 175, 686	106, 324
Amberjack			31, 457	$2, 070	75, 559	3, 601
Barracuda					17, 360	521
Black bass					508, 991	54, 394
Bluefish	167	$28	500	58	1, 900, 883	167, 225
Blue runner or hardtail					811, 398	14, 477
Bonito	150	30			9, 785	357
Bowfin					24, 567	460
Buffalofish					64, 077	3, 528
Butterfish					76, 070	1, 853
Cabio or crab eater					14, 727	457
Carp					527, 088	36, 804
Catfish and bullheads	52, 249	2, 327	146, 875	6, 157	6, 299, 098	283, 404
Cero					32, 220	1, 727
Cigarfish					89, 100	2, 673
Crappie					1, 007, 760	39, 882
Crevalle			700	26	270, 910	8, 282
Croaker	80, 647	3, 330	64, 138	2, 880	8, 014, 270	129, 279
Dolphin					5, 000	500
Drum:						
Black	266, 367	15, 565	951, 277	32, 931	1, 339, 850	52, 926
Red or redfish	444, 863	43, 476	934, 286	104, 889	3, 031, 340	220, 874
Eels					126, 571	7, 625
Flounders	25, 389	2, 641	65, 371	9, 567	1, 061, 255	81, 441
Garfish	800	16			800	16
Gizzard shad					54, 940	361
Groupers	4, 000	240	15, 998	529	4, 352, 499	134, 362
Grunts					89, 131	3, 805
Harvestfish or "starfish"					616, 073	14, 029
Hickory shad					415, 951	26, 770
Hogfish					3, 600	108
Jewfish	10, 000	4, 000	43, 859	2, 921	144, 338	11, 726
Kingfish or "king mackerel"			4, 500	180	4, 340, 700	226, 515
King whiting or "kingfish"	41, 829	2, 092	28, 699	1, 594	1, 309, 377	53, 218
Menhaden					253, 234, 620	1, 143, 706
Mojarro					549, 978	22, 151
Moonfish					110	3
Mullet	69, 491	3, 496	13, 000	390	33, 660, 810	1, 328, 065
Muttonfish					225, 632	18, 510
Paddlefish or spoonbill cat					3, 068	278
Permit					17, 796	566
Pigfish					298, 394	6, 393
Pike					16, 027	1, 806
Pinfish or sailors choice					151, 731	3, 718
Pompano	808	231	10, 295	1, 917	507, 977	106, 656
Porgies					160, 447	4, 836
Porkfish					500	15
Sea bass	150	15			666, 031	53, 595
Shad					3, 346, 409	619, 605
Sharks					176, 000	2, 200
Sheepshead, salt-water	100, 507	9, 741	45, 720	2, 719	1, 216, 503	59, 270
Snapper:						
Mangrove					266, 722	14, 451
Red	80, 000	10, 400	804, 140	72, 847	9, 969, 492	816, 358
Snook or sergeantfish			113, 299	10, 653	693, 495	34, 882
Spadefish			5, 617	291	104, 433	3, 713
Spanish mackerel	9, 110	929	87, 459	10, 289	6, 214, 718	393, 039
Spot	41, 496	2, 292			3, 713, 329	95, 018
Squeteagues or "sea trout"	512, 768	70, 748	1, 178, 052	159, 913	11, 330, 377	875, 355
Squirrelfish					1, 567	69
Striped bass					246, 357	41, 224
Sturgeon					40, 388	7, 978
Suckers					153	11
Sunfish					538, 404	15, 832
Tautog					538	43
Tenpounder					281, 145	6, 687
Tripletail					13, 820	589
Turbot					200	6
White perch					221, 436	15, 439
Yellow perch					102, 173	7, 270
Yellowtail	1, 175	47			180, 425	12, 881
Total	1, 741, 966	171, 644	4, 545, 242	422, 821	375, 962, 766	7, 401, 812

Fisheries of the South Atlantic and Gulf States, 1929—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SHELLFISH, ETC.						
Crabs:						
Hard	2, 674, 738	$78, 493	162, 812	$11, 346	5, 450, 768	$151, 918
Soft	80, 550	24, 690			447, 542	82, 144
Stone					226, 660	22, 810
Sea crawfish or spiny lobster					413, 266	36, 681
Shrimp	49, 455, 982	2, 025, 336	9, 415, 317	327, 008	108, 550, 538	4, 435, 366
Squid					1, 790	143
Clams, hard					1, 148, 376	114, 137
Oysters:						
Market, public	1. 422, 820	32, 971	2, 435, 643	136, 867	33, 056, 306	1, 190, 092
Market, private	6. 476, 849	405, 439	65, 100	9, 300	8, 225, 869	482, 048
Seed, public					523, 012	19, 117
Scallops, bay					710, 314	45, 647
Octopus					937	75
Terrapin	67, 000	26, 100			104, 936	40, 284
Turtles					36, 858	1, 591
Sponges:						
Grass					85, 163	22, 234
Sheepswool					321, 884	808, 622
Wire					11, 060	4, 424
Yellow					110, 614	44, 366
Conchs					6, 200	434
Total	60, 177, 939	2, 593, 029	12,078,872	484, 521	159, 432, 093	7, 502, 133
Grand total	61, 919, 905	2, 764, 673	16,624,114	907, 342	535, 394, 859	14, 903, 945

PRODUCTION OF CERTAIN SHELLFISH SHOWN IN NUMBERS AND BUSHELS

Products	North Carolina		South Carolina		Georgia	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard ... number	2, 563, 800	$15, 170	180, 000	$1, 800	675, 000	$5, 813
Soft ... do	1, 054, 020	52, 620				
Clams, hard ... bushels	47, 543	59, 843	2, 525	2, 665	225	280
Oysters:						
Market, public ... do	510, 061	243, 029	529, 465	98, 607	27, 446	6, 539
Market, private ... do	2, 334	2, 504	128, 837	27, 054	51, 249	13, 431
Seed, public ... do	74, 716	19, 117				
Scallops, bay ... do	114, 370	37, 960				

Products	Florida		Alabama		Mississippi	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard ... number	369, 672	$3, 588	309, 684	$2, 605	3, 741, 498	$33, 103
Soft ... do			10, 800	850	36, 156	3, 984
Stone ... do	302, 213	22, 810				
Clams, hard ... bushels	93, 254	51, 349				
Oysters:						
Market, public ... do	402, 834	213, 021	42, 732	8, 152	2, 658, 582	450, 906
Market, private ... do	34, 540	10, 640	14, 400	10, 800	9, 200	2, 880
Seed, public ... do						
Scallops, bay ... do	4, 016	7, 687				

Products	Louisiana		Texas		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard ... number	8, 024, 214	$78, 493	488, 436	$11, 346	16, 352, 304	$151, 918
Soft ... do	241, 650	24, 690			1, 342, 626	82, 144
Stone ... do					302, 213	22, 810
Clams, hard ... bushels					143, 547	114, 137
Oysters:						
Market, public ... do	203, 620	32, 971	347, 949	136, 867	4, 722, 329	1, 190, 092
Market, private ... do	925, 264	405, 439	9, 300	9, 300	1, 175, 124	482, 018
Seed, public ... do					74, 716	19, 117
Scallops, bay ... do					118, 386	45, 647

Industries related to the fisheries of the South Atlantic and Gulf States, 1929

Items	North Carolina	South Carolina	Georgia	Florida	Alabama
Transporting:					
Persons engaged—	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	50	92		41	12
On boats	35	32	17		
Total	85	124	17	41	12
Vessels—					
Motor	33	10		18	6
Net tonnage	349	107		296	55
Sail		40			
Net tonnage		387			
Total vessels	33	50		18	6
Total net tonnage	349	494		296	55
Boats	35	16	15		
Wholesale:					
Establishments	68	22	32	246	10
Persons engaged	358	219	285	1, 387	95
Salaries and wages	$164, 367	$57, 717	$157, 029	$747, 243	$85, 153
Manufacturing:					
Establishments	22	19	11	21	7
Persons engaged	382	470	408	487	207
Salaries and wages	$207, 599	$220, 353	$164, 789	$327, 694	$87, 404
Products	$1, 165, 537	$1, 024, 331	$957, 437	$1, 866, 495	$442, 002
Fishermen's prepared products:					
Persons engaged	361	264		127	2
Products	$64, 998	$14, 890		$27, 387	$88

Items	Mississippi	Louisiana	Texas	Total
Transporting:				
Persons engaged—	*Number*	*Number*	*Number*	*Number*
On vessels	6	166		367
On boats		306		390
Total	6	472		757
Vessels—				
Motor	2	83		152
Net tonnage	21	633		1, 461
Sail	1			41
Net tonnage	15			402
Total vessels	3	83		193
Total net tonnage	36	633		1, 863
Boats		214		280
Wholesale:				
Establishments	25	33	62	498
Persons engaged	317	372	361	3, 394
Salaries and wages	$127, 496	$313, 446	$183, 105	$1, 835, 556
Manufacturing:				
Establishments	29	56	9	174
Persons engaged	1, 084	1, 665	205	4, 908
Salaries and wages	$528, 089	$680, 510	$103, 452	$2, 319, 890
Products	$2, 533, 466	$4, 949, 682	$402, 613	$13, 341, 563
Fishermen's prepared products:				
Persons engaged		3		757
Products		$508		$107, 871

NORTH CAROLINA

The fisheries and industries related to the fisheries of North Carolina in 1929 employed 6,792 persons, which is less than one-half of 1 per cent less than the number employed in 1928. Of the total number of persons, 5,975 were fishermen, 85 were employed on transporting vessels and boats, 358 in the wholesale trade, and 382 in manufacturing industries. Of the number employed on transporting vessels and boats, 8 represent a duplication of those persons shown as fishermen. There also were 361 fishermen engaged in the manufacture of prepared fishery products. These have already been included as fishermen.

The total catch amounted to 217,595,293 pounds valued at $2,544,007, which is an increase of 53 per cent in the catch but a decrease of 3 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of menhaden accounted for 28 per cent; shad, 14 per cent; and squeteagues and oysters, each 10 per cent. Of the total weight of the catch, that of menhaden accounted for 80 per cent; alewives, 5 per cent; and croakers, 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in North Carolina during 1929 was taken by 5,975 fishermen, who used 80 motor vessels, 64 sailing vessels, 3,746 motor and other small fishing boats, and 16 major types of gear. The vessels had a combined capacity of 2,450 net tons. The fisheries accounting for the greatest number of persons were the fishery with rakes employing 1,071 fishermen and that with common haul seines employing 1,807 fishermen.

CATCH BY GEAR

Four types of gear accounted for 97 per cent of the fishery products taken in the fisheries of North Carolina during 1929. Listed in order of their importance they were: Purse seines, which accounted for 80 per cent of the catch; pound nets, 7 per cent; haul seines, 6 per cent; and gill nets, 4 per cent. The catch by purse seines consisted almost exclusively of menhaden; that by pound nets principally alewives, croakers and shad; that by haul seines chiefly croaker, spot, alewives, squeteagues, and mullet; and that by gill nets principally croaker, squeteagues, and mullet.

OPERATING UNITS BY COUNTIES

Carteret County was foremost in the number of persons fishing, accounting for 37 per cent of the total. Dare County followed with 10 per cent. Other counties employing a considerable number of fishermen were Brunswick, Onslow, Pender, and Currituck. Carteret County also ranked first in the number of vessels, and motor and other small fishing boats operated, accounting for 55 per cent of the total number of fishing vessels and 35 per cent of the motor and other small fishing boats. Beaufort County and Pamlico County each accounted for 15 per cent of the total number of vessels, and Dare County accounted for 13 per cent of the small fishing boats.

CATCH BY COUNTIES

Fishing was prosecuted along the coast and in the coastal rivers and bays of 23 counties of North Carolina during 1929. Ranked according to value, the fisheries of Carteret County were most important, accounting for 70 per cent of the total catch and 45 per cent of the total value of the catch. Dare County was next in the value of the catch, accounting for 3 per cent of the quantity and 18 per cent of the value. Other important producing counties listed in order of their importance with respect to the value of the catch were Brunswick, Pamlico, Currituck, and Beaufort.

Fisheries of North Carolina, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines		Haul seines		Gill nets			
	Menhaden	Other	Common	Long	Anchor	Drift	Runaround	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	695	--------	--------	116	9	--------	--------	--------
On boats and shore—								
Regular	55	14	879	132	424	199	322	248
Casual	--------	--------	928	30	118	25	233	143
Total	750	14	1,807	278	551	224	555	391
Vessels:								
Motor—								
5 to 10 tons	5	--------	--------	26	2	--------	--------	--------
11 to 20 tons	4	--------	--------	2	--------	--------	--------	--------
21 to 30 tons	4	--------	--------	--------	--------	--------	--------	--------
31 to 40 tons	6	--------	--------	--------	--------	--------	--------	--------
41 to 50 tons	7	--------	--------	--------	--------	--------	--------	--------
51 to 60 tons	7	--------	--------	--------	--------	--------	--------	--------
61 to 70 tons	3	--------	--------	--------	--------	--------	--------	--------
71 to 80 tons	3	--------	--------	--------	--------	--------	--------	--------
Total	39	--------	--------	28	2	--------	--------	--------
Net tonnage	1,567	--------	--------	193	15	--------	--------	--------
Total vessels	39	--------	--------	28	2	--------	--------	--------
Total net tonnage	1,567	--------	--------	193	15	--------	--------	--------
Boats:								
Motor	7	2	206	65	212	44	127	173
Other	14	4	391	43	112	48	337	128
Accessory boats	76	--------	--------	56	--------	--------	--------	--------
Apparatus:								
Number	46	2	493	59	2,370	89	552	10,946
Length, yards	18,415	375	81,016	60,540	--------	--------	--------	--------
Square yards	--------	--------	--------	--------	1,398,142	178,938	241,082	631,776

Items	Lines				Pound nets	Wheels	Fyke nets	Dip nets	Otter trawls		Traps, turtle
	Hand	Troll	Trot, with baits or snoods	Trot, with hooks					Fish	Shrimp	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	19	------	------	------	------	------	------	------	3	8	------
On boats and shore—											
Regular	70	106	44	18	541	------	21	275	------	89	------
Casual	14	------	72	27	130	5	26	193	------	8	5
Total	103	106	116	45	671	5	47	468	3	105	5
Vessels:											
Motor—											
5 to 10 tons	4	------	------	------	------	------	------	------	1	4	------
11 to 20 tons	1	------	------	------	------	------	------	------	------	------	------
Total	5	------	------	------	------	------	------	------	1	4	------
Net tonnage	48	------	------	------	------	------	------	------	10	31	------
Total vessels	5	------	------	------	------	------	------	------	1	4	------
Total net tonnage	48	------	------	------	------	------	------	------	10	31	------
Boats:											
Motor	20	35	56	4	306	------	27	35	------	48	------
Other	16	------	30	22	194	5	17	385	------	------	4
Accessory boats	3	------	------	------	------	------	------	------	------	------	------
Apparatus:											
Number	156	102	116	69	2,738	20	678	468	1	52	25
Yards at mouth	------	------	------	------	------	------	------	------	15	809	------
Hooks, baits, or snood	516	102	83,720	314	------	------	------	------	------	------	------

Fisheries of North Carolina, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Pots, eel	Spears	Dredges			Tongs	Rakes	Grabs	By hand	Total, exclusive of duplication
			Crab	Oyster	Scallop					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels				188		3				1,032
On boats and shore—										
Regular	38	45	138	32	188	348	435	20	324	2,544
Casual	18	76	57	57	135	222	636		133	2,399
Total	56	121	195	277	323	573	1,071	20	457	5,975
Vessels:										
Motor—										
5 to 10 tons						2				42
11 to 20 tons				1						8
21 to 30 tons										4
31 to 40 tons										6
41 to 50 tons										7
51 to 60 tons										7
61 to 70 tons										3
71 to 80 tons										3
Total				1		2				80
Net tonnage				19		15				1,883
Sail—										
5 to 10 tons				50						50
11 to 20 tons				13						13
21 to 30 tons				1						1
Total				64						64
Net tonnage				567						567
Total vessels				65		2				144
Total net tonnage				586		15				2,450
Boats:										
Motor	35		185	16	279	154	103		76	1,438
Other	4	116		29		368	739	20	286	2,308
Accessory boats										137
Apparatus:										
Number	1,423	121	453	204	703	598	1,246	20		
Yards at mouth			398	224	630					

CATCH: BY GEAR

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					1,760,695	$14,578	1,165	$26
Black bass					74,790	10,829	6,275	1,030
Bluefish					42,830	2,735	23,884	1,153
Bowfin					18,430	221	1,362	30
Butterfish					6,375	175	5,295	199
Carp					243,616	15,731	124,490	9,980
Catfish and bullheads					60,345	1,675	38,048	1,641
Crappie					2,330	70		
Croaker					686,630	10,830	3,048,910	43,220
Drum: Red					114,200	2,210	53,425	585
Eels							850	85
Flounders					37,337	1,935	36,618	1,541
Gizzard shad					6,040	92	900	9
Harvestfish or "starfish"					48,800	1,151	24,013	856
Hickory shad					9,740	470		
King whiting or "kingfish"					94,970	4,185	500	20
Menhaden	173,009,400	$716,215					480,440	2,300
Mullet	46,760	2,221			1,522,540	65,085	3,145	177
Pigfish					39,160	724	120,778	1,852
Pike					12,091	1,267		
Pompano					520	52	7,189	610
Shad					67,673	11,900	2,262	400

Fisheries of North Carolina, 1929—Continued

CATCH: By gear—Continued

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sheepshead					6, 475	$368	9, 545	$430
Spadefish							5, 291	226
Spanish mackerel					3, 266	300	2, 925	260
Spot					1, 551, 015	46, 365	921, 350	15, 577
Squeteagues or "sea trout"			7, 820	$900	701, 565	55, 660	1, 014, 557	51, 220
Striped bass					55, 670	7, 901	24, 982	3, 800
Suckers					33	5		
Sunfish					24, 700	369	2, 467	27
White perch					83, 616	4, 471	29, 780	2, 400
Yellow perch					24, 940	1, 348	7, 060	261
Yellowtail					9, 000	135		
Crabs: Soft					100, 120	15, 020		
Shrimp					81, 875	3, 525		
Terrapin					4, 937	1, 927		
Turtles					600	24		
Total	173, 056, 160	$718, 436	7, 820	900	7, 496, 918	283, 333	5, 997, 506	139, 915

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	537, 970	$9, 695	30, 000	$200	43, 000	$1, 060	445, 030	$9, 675
Black bass					1, 000	100		
Bluefish	9, 710	772	68, 300	3, 990	92, 692	6, 330	298, 459	24, 736
Bonito	400	20						
Bowfin							400	28
Carp	4, 250	340			2, 250	90	1, 262	59
Catfish and bullheads	5, 016	301			1, 333	40		
Cero			4, 170	125				
Crappie							50	10
Croaker	1, 674, 210	25, 572			143, 700	2, 923	163, 666	3, 010
Drum: Red					1, 600	35	13, 700	290
Flounders					4, 835	219	4, 150	300
Harvestfish or "starfish"							3, 750	75
Hickory shad	33, 354	2, 479	150	10	167	17	63, 722	3, 237
King whiting or "kingfish"	180, 895	7, 607			17, 497	824	10, 320	360
Mullet			1, 250	50	964, 765	54, 265	29, 748	1, 914
Pigfish							330	5
Shad	282, 838	50, 739	65, 506	12, 625	16, 238	3, 200	202, 979	39, 927
Sheepshead							1, 080	54
Spanish mackerel	2, 930	440	45, 300	4, 300	24, 000	2, 400		
Spot	304, 580	4, 944	41, 200	1, 240	278, 260	8, 773	98, 600	1, 878
Squeteagues or "sea trout"	754, 128	42, 240			351, 691	27, 550	256, 255	20, 320
Striped bass	51, 539	9, 899	235	32	1, 500	150	11, 429	1, 828
Sturgeon			1, 000	200			125	13
Sunfish							100	15
White perch	5, 753	511			600	60	1, 279	135
Yellow perch					1, 000	30		
Total	3, 847, 573	155, 559	257, 111	22, 772	1, 946, 128	108, 066	1, 606, 434	107, 869

Fisheries of North Carolina, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	57,856	$5,772	------	------	------	------	19,500	$1,950
Bonito	200	12	------	------	------	------	500	30
Carp	------	------	------	------	------	------	1,000	60
Catfish and bullheads	7,143	500	------	------	------	------	20,400	1,290
Cero	------	------	13,250	$960	------	------	------	------
Crappie	------	------	------	------	------	------	500	100
Drum:								
Black	200	10	------	------	------	------	600	30
Red	500	16	------	------	------	------	400	12
Eels	------	------	------	------	------	------	500	30
Flounders	1,400	70	------	------	------	------	700	39
Grunts	9,984	577	------	------	------	------	1,600	80
Pigfish	8,583	590	------	------	------	------	3,000	100
Pinfish or sailors choice	5,249	283	------	------	------	------	5,350	160
Porgies	1,714	120	------	------	------	------	------	------
Sea bass	190,958	14,524	------	------	------	------	69,700	5,830
Sheepshead	456	32	------	------	------	------	300	24
Snapper:								
Mangrove	2,400	216	------	------	------	------	1,066	96
Red	11,400	951	------	------	------	------	3,780	340
Spadefish	240	12	------	------	------	------	500	25
Spanish mackerel	320	32	40,350	4,035	------	------	------	------
Squeteague or "sea trout"	1,286	90	------	------	------	------	------	------
Squirrelfish	600	18	------	------	------	------	530	16
Tautog	538	43	------	------	------	------	------	------
Crabs: Hard	------	------	------	------	729,600	$12,670	------	------
Squid	1,790	143	------	------	------	------	------	------
Total	302,817	24,011	53,600	4,995	729,600	12,670	129,926	10,212

Species	Pounds nets		Wheels		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,862,560	$65,785	------	------	72,037	$1,129	15,000	$75
Black bass	------	------	------	------	2,430	395	------	------
Bluefish	17,935	890	------	------	------	------	------	------
Bowfin	------	------	------	------	4,375	181	------	------
Butterfish	64,400	1,479	------	------	------	------	------	------
Carp	33,532	1,808	------	------	116,688	8,736	------	------
Catfish and bullheads	184,613	7,562	------	------	82,514	3,690	------	------
Crappie	------	------	------	------	1,350	115	------	------
Croaker	1,871,275	29,192	------	------	1,000	20	------	------
Drum: Red	11,250	200	------	------	------	------	------	------
Eels	6,047	393	------	------	650	38	------	------
Flounders	502,239	35,981	------	------	3,325	316	------	------
Gizzard shad	44,000	220	------	------	4,000	40	------	------
Harvestfish or "starfish"	539,510	11,947	------	------	------	------	------	------
Hickory shad	211,562	11,239	------	------	700	105	------	------
King whiting or "kingfish"	10,700	535	------	------	------	------	------	------
Mullet	------	------	------	------	200	15	------	------
Pigfish	3,000	45	------	------	------	------	------	------
Pike	120	15	------	------	3,816	524	------	------
Pompano	4,690	434	------	------	------	------	------	------
Shad	1,275,497	231,593	------	------	272	40	------	------
Sheepshead	5,490	514	------	------	------	------	------	------
Spadefish	11,680	670	------	------	------	------	------	------
Spanish mackerel	22,590	2,257	------	------	------	------	------	------
Spot	114,660	1,751	------	------	------	------	------	------
Squeteagues or "sea trout"	1,967,550	55,833	------	------	------	------	------	------
Striped bass	95,397	16,424	------	------	5,605	1,190	------	------
Sturgeon	492	153	------	------	------	------	------	------
Suckers	------	------	------	------	120	6	------	------
Sunfish	300	15	------	------	6,000	210	------	------
Tenpounder	------	------	------	------	2,500	50	------	------
White perch	71,909	5,655	920	$92	27,585	2,115	------	------
Yellow perch	5,562	499	20	2	63,591	5,130	------	------
Crabs: Soft	------	------	------	------	------	------	156,600	23,555
Scallops, bay	------	------	------	------	------	------	48,420	2,500
Terrapin	------	------	------	------	668	250	------	------
Turtles	------	------	------	------	2,000	60	------	------
Total	14,938,560	483,089	940	94	401,426	24,355	220,020	26,130

Fisheries of North Carolina, 1929—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls				Traps, turtle		Pots, eel	
	Fish		Shrimp					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker	90,000	$1,800						
Eels							98,906	$6,098
Flounders	18,950	1,800	52,320	$1,470				
King whiting or "kingfish"	4,286	300	68,000	1,360				
Squirrelfish	1,429	100	34,000	680				
Shrimp			815,620	27,035				
Terrapin					257	$120		
Turtles					6,670	200		
Total	114,665	4,000	969,940	30,545	6,927	320	98,906	6,098

Species	Spears		Dredges					
			Crab		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	63,385	$3,840						
Crabs:								
Hard			125,000	$2,500				
Soft			94,620	14,045				
Oysters:								
Market, public					2,586,323	$173,308		
Seed, public					135,212	5,267		
Scallops, bay							304,860	$17,000
Total	63,385	3,840	219,620	16,545	2,721,535	178,575	304,860	17,000

Species	Tongs		Rakes		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard	37,160	$5,788	240,272	$39,005			102,904	$15,050
Oysters:								
Market, public	664,279	51,047	2,723	234	49,000	$1,750	268,100	16,690
Market, private	16,338	2,504						
Seed, public	287,000	10,250					100,800	3,600
Scallops, bay			332,940	18,460				
Terrapin							1,400	300
Total	1,004,777	69,589	575,935	57,699	49,000	1,750	473,204	35,640

OPERATING UNITS: BY COUNTIES

Items	Beaufort	Bertie	Brunswick	Camden	Carteret	Chowan	Craven	Currituck
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	57		160		707		6	
On boats and shore—								
Regular	42	24	78		987	102	15	87
Casual	165	21	270	6	542	15	77	221
Total	264	45	508	6	2,236	117	98	308
Vessels:								
Motor—								
5 to 10 tons			4		32		1	
11 to 20 tons					8			
21 to 30 tons					4			
31 to 40 tons			3		3			
41 to 50 tons			3		4			
51 to 60 tons			1		6			
61 to 70 tons			1		2			
71 to 80 tons					3			
Total			12		62		1	
Net tonnage			405		1,436		5	

Fisheries of North Carolina, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Beaufort	Bertie	Brunswick	Camden	Carteret	Chowan	Craven	Currituck
Vessels—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Sail—								
5 to 10 tons	20	--------	--------	--------	12	--------	--------	--------
11 to 20 tons	1	--------	--------	--------	5	--------	--------	--------
21 to 30 tons	1	--------	--------	--------	--------	--------	--------	--------
Total	22	--------	--------	--------	17	--------	--------	--------
Net tonnage	191	--------	--------	--------	158	--------	--------	--------
Total vessels	22	--------	12	--------	79	--------	1	--------
Total net tonnage	191	--------	405	--------	1, 594	--------	5	--------
Boats:								
Motor	65	13	38	2	539	52	21	128
Other	95	12	118	3	760	29	45	117
Accessory boats	--------	--------	16	--------	108	--------	3	--------
Apparatus:								
Purse seines—								
Menhaden	--------	--------	8	--------	38	--------	--------	--------
Length, yards	--------	--------	2, 660	--------	15, 755	--------	--------	--------
Haul seines—								
Common	14	1	10	--------	218	--------	9	112
Length, yards	4, 100	1, 500	1, 400	--------	21, 339	--------	1, 975	20, 911
Long	--------	--------	--------	--------	30	--------	1	8
Length, yards	--------	--------	--------	--------	36, 440	--------	1, 200	6, 200
Gill nets—								
Anchor	--------	--------	--------	60	147	113	--------	176
Square yards	--------	--------	--------	15, 600	330, 500	52, 400	--------	87, 900
Drift	--------	--------	1	--------	33	--------	--------	--------
Square yards	--------	--------	1, 100	--------	93, 200	--------	--------	--------
Runaround	8	--------	42	--------	134	--------	4	--------
Square yards	3, 050	--------	17, 149	--------	91, 325	--------	2, 000	--------
Stake	830	--------	--------	4	2, 191	--------	451	--------
Square yards	51, 258	--------	--------	600	147, 630	--------	24, 664	--------
Lines—								
Hand	--------	--------	40	--------	22	--------	--------	--------
Hooks	--------	--------	96	--------	44	--------	--------	--------
Troll	--------	--------	--------	--------	102	--------	--------	--------
Hooks	--------	--------	--------	--------	102	--------	--------	--------
Trot with baits or snoods	51	--------	--------	--------	--------	--------	--------	11
Baits or snoods	39, 150	--------	--------	--------	--------	--------	--------	5, 500
Trot with hooks	--------	--------	2	--------	32	--------	--------	--------
Hooks	--------	--------	120	--------	64	--------	--------	--------
Pound nets	164	91	--------	--------	177	565	22	8
Wheels	--------	--------	--------	--------	--------	--------	20	--------
Fyke nets	25	--------	--------	8	--------	12	--------	425
Dip nets	--------	--------	--------	--------	467	--------	--------	--------
Otter trawls—Shrimp	--------	--------	32	--------	20	--------	--------	--------
Yards at mouth	--------	--------	535	--------	274	--------	--------	--------
Pots, eel	45	--------	--------	--------	50	24	--------	727
Spears	--------	--------	--------	--------	12	--------	--------	--------
Dredges—								
Crab	--------	--------	--------	--------	453	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	398	--------	--------	--------
Oyster	62	--------	--------	--------	36	--------	--------	--------
Yards at mouth	66	--------	--------	--------	42	--------	--------	--------
Scallop	--------	--------	--------	--------	703	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	630	--------	--------	--------
Tongs	--------	--------	27	--------	278	--------	--------	--------
Rakes	--------	--------	105	--------	716	--------	--------	--------
Grabs	--------	--------	--------	--------	20	--------	--------	--------

Fisheries of North Carolina, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Dare	Gates	Hertford	Hyde	Lenoir	Martin	New Hanover	Onslow
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	3	--------	--------	2	--------	--------	--------	8
On boats and shore—								
Regular	605	--------	6	92	--------	2	204	165
Casual	13	8	--------	82	30	75	64	168
Total	621	8	6	176	30	77	268	341
Vessels:								
Motor—								
5 to 10 tons	--------	--------	--------	--------	--------	--------	--------	2
Net tonnage	--------	--------	--------	--------	--------	--------	--------	17
Sail—								
5 to 10 tons	1	--------	--------	1	--------	--------	--------	--------
Net tonnage	7	--------	--------	6	--------	--------	--------	--------
Total vessels	1	--------	--------	1	--------	--------	--------	2
Total net tonnage	7	--------	--------	6	--------	--------	--------	17
Boats:								
Motor	263	3	2	65	--------	4	11	53
Other	207	1	3	56	17	22	176	287
Apparatus:								
Purse seines—								
Other than menhaden	2	--------	--------	--------	--------	--------	--------	--------
Length, yards	375	--------	--------	--------	--------	--------	--------	--------
Haul seines—								
Common	42	--------	--------	8	1	3	22	20
Length, yards	14, 950	--------	--------	1, 600	80	900	2, 760	2, 281
Long	16	--------	--------	--------	--------	--------	--------	--------
Length, yards	12, 600	--------	--------	--------	--------	--------	--------	--------
Gill nets—								
Anchor	688	2	--------	--------	--------	1	1	15
Square yards	352, 500	700	--------	--------	--------	170	2, 930	14, 498
Drift	1	--------	--------	--------	--------	12	42	--------
Square yards	1, 375	--------	--------	--------	--------	853	82, 410	--------
Runaround	28	--------	--------	34	--------	--------	72	167
Square yards	15, 875	--------	--------	20, 000	--------	--------	18, 320	54, 906
Stake	5, 039	--------	--------	1, 050	3	3	125	62
Square yards	258, 340	--------	--------	65, 300	200	54	6, 400	9, 450
Lines—								
Hand	--------	--------	--------	--------	--------	--------	44	50
Hooks	--------	--------	--------	--------	--------	--------	80	296
Trot with baits or snoods	8	--------	--------	1	--------	--------	5	--------
Baits or snoods	5, 520	--------	--------	800	--------	--------	750	--------
Trot with hooks	--------	--------	--------	--------	25	10	--------	--------
Hooks	--------	--------	--------	--------	50	80	--------	--------
Pound nets	1, 153	4	15	116	--------	--------	--------	--------
Fyke nets	--------	14	--------	--------	--------	--------	--------	--------
Pots, eel	200	--------	--------	--------	--------	--------	--------	77
Spears	--------	--------	--------	--------	--------	--------	15	79
Dredges—Oyster	2	--------	--------	38	--------	--------	--------	--------
Yards at mouth	2	--------	--------	42	--------	--------	--------	--------
Tongs	19	--------	--------	71	--------	--------	20	87
Rakes	27	--------	--------	--------	--------	--------	84	39

Items	Pamlico	Pasquotank	Pender	Perquimans	Pitt	Tyrrell	Washington
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	81	8	--------	--------	--------	--------	--------
On boats and shore—							
Regular	61	31	19	9	--------	2	13
Casual	145	9	294	20	10	104	60
Total	287	48	313	29	10	106	73
Vessels:							
Motor—							
5 to 10 tons	2	1	--------	--------	--------	--------	--------
Net tonnage	10	10	--------	--------	--------	--------	--------
Sail—							
5 to 10 tons	14	2	--------	--------	--------	--------	--------
11 to 20 tons	6	1	--------	--------	--------	--------	--------
Total	20	3	--------	--------	--------	--------	--------
Net tonnage	175	30	--------	--------	--------	--------	--------
Total vessels	22	4	--------	--------	--------	--------	--------
Total net tonnage	185	40	--------	--------	--------	--------	--------

Fisheries of North Carolina, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Pamlico	Pasquotank	Pender	Perquimans	Pitt	Tyrrell	Washington
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Boats:							
Motor	90	18	2	17		38	14
Other	71	20	184	14	2	51	18
Accessory boats	10						
Apparatus:							
Haul seines—							
Common	13		17		1		2
Length, yards	2, 800		2, 220		600		1, 600
Long	4						
Length, yards	4, 100						
Gill nets—							
Anchor		456		322		275	114
Square yards		159, 826		171, 564		148, 854	60, 700
Runaround	1		62				
Square yards	300		18, 157				
Stake	518					670	
Square yards	38, 540					29, 340	
Lines—							
Trot with baits or snoods	40						
Baits or snoods	32, 000						
Pound nets	223	22		54		79	45
Fyke nets		71				123	
Dip nets							1
Otter trawls—Fish		1					
Yards at mouth		15					
Traps, turtle	25						
Pots, eel	45	50		140		65	
Spears			15				
Dredges—Oyster	60	6					
Yards at mouth	65	7					
Tongs	67		29				
Rakes			275				

CATCH: BY COUNTIES

Species	Beaufort		Bertie		Brunswick		Camden	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	362, 230	$5, 800	1, 167, 600	$10, 210			4, 767	$123
Black bass							125	15
Bluefish					4, 000	$400		
Bowfin							1, 000	10
Carp	28, 125	885					300	15
Catfish and bullheads	20, 450	283			18, 000	1, 080	1, 625	65
Croaker	280, 100	2, 823			18, 500	555	1, 000	20
Drum: Red	200	10			1, 500	30		
Eels	9, 863	575					250	10
Flounders	17, 075	704			34, 000	680	125	8
Hickory shad	27, 921	1, 380	200	6			245	13
King whiting or "kingfish"					69, 000	1, 410		
Menhaden					34, 193, 200	152, 076		
Mullet	8, 237	655			262, 760	13, 021	100	10
Pike	320	35					250	15
Sea bass					13, 846	900		
Shad	69, 457	13, 955	30, 739	4, 210			5, 000	790
Snapper: Red					1, 540	100		
Spot	5, 430	63			11, 250	450		
Squeteagues or "sea trout"	107, 835	2, 235			44, 000	1, 880		
Striped bass	13, 737	2, 180	10, 500	1, 575			1, 245	227
Sunfish	1, 300	35					250	5
Tenpounder	2, 500	50						
White perch	4, 417	465					437	35
Yellow perch	4, 336	350					125	10
Crabs: Hard	297, 000	5, 400						
Shrimp					587, 840	17, 635		
Clams, hard					33, 600	6, 300		
Oysters:								
Market, public	838, 633	55, 300			35, 000	2, 000		
Seed, public	17, 500	600						
Terrapin	668	250						
Turtles	2, 000	60						
Total	2, 119, 334	94, 093	1, 209, 039	16, 001	35, 328, 036	198, 517	16, 844	1, 371

Fisheries of North Carolina, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Carteret		Chowan		Craven		Currituck	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	15, 160	$235	4, 588, 645	$36, 347	27, 900	$520	23, 200	$561
Black bass							81, 600	11, 969
Bluefish	310, 445	21, 799			747	45	2, 420	242
Bonito	700	42					400	20
Bowfin							20, 792	309
Butterfish	16, 195	500			5, 500	125		
Carp			1, 116	73	416	25	464, 390	33, 833
Catfish and bullheads			26, 326	1, 460	100	5	111, 548	4, 480
Cero	17, 420	1, 085						
Crappie			800	40			2, 330	70
Croaker	4, 377, 556	64, 610			163, 230	2, 465	77, 770	2, 858
Drum:								
Black	800	40						
Red	115, 250	1, 358			2, 000	25	1, 500	75
Eels	900	90	12, 800	648			39, 881	2, 866
Flounders	76, 220	3, 708			3, 020	120	10, 224	660
Gizzard shad			44, 000	220			10, 640	138
Grunts	6, 300	280						
Harvestfish or "starfish"	121, 723	3, 252			53, 500	1, 205		
Hickory shad	47, 030	2, 185	33, 370	2, 135	11, 614	555	3, 520	176
King whiting or "kingfish"	139, 500	5, 865					61, 800	3, 172
Menhaden	139, 296, 640	566, 439						
Mullet	1, 080, 442	45, 291			16, 125	1, 060	10, 325	516
Pigfish	153, 398	2, 491						
Pike							14, 814	1, 696
Pinfish or sailors choice	7, 950	254						
Pompano	5, 802	487			250	20		
Sea bass	166, 760	13, 594						
Shad	52, 075	9, 990	89, 119	15, 020	51, 167	10, 350	21, 407	4, 180
Sheepshead	10, 345	532			250	20		
Snapper:								
Mangrove	3, 466	312						
Red	11, 280	1, 015						
Spadefish	11, 256	477						
Spanish mackerel	115, 775	11, 325			400	33	260	40
Spot	1, 872, 820	37, 762			41, 570	625	256, 880	11, 744
Squeteagues or "sea trout"	1, 905, 492	97, 190			82, 000	3, 410	46, 313	4, 179
Squirrelfish	1, 130	34						
Striped bass	2, 046	285	23, 445	3, 899	5, 995	873	30, 591	5, 785
Sturgeon					125	13		
Suckers					33	5		
Sunfish					15	3	28, 827	425
White perch			28, 605	2, 305	1, 092	117	102, 678	5, 689
Yellow perch			3, 585	252	20	2	66, 490	4, 208
Yellowtail	9, 000	135						
Crabs:								
Hard	125, 000	2, 500					17, 500	300
Soft	348, 840	52, 320						
Shrimp	250, 030	10, 500						
Clams, hard	242, 984	36, 200						
Oysters:								
Market, public	1, 257, 242	90, 055						
Seed, public	315, 000	11, 250						
Scallops, bay	686, 220	37, 960						
Terrapin	2, 800	600					213	151
Turtles							600	24
Total	153, 178, 992	1, 134, 047	4, 851, 811	62, 399	467, 069	21, 621	1, 508, 913	100, 366

Species	Dare		Gates		Hertford		Hyde	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	252, 990	$4, 196	40, 000	$300	124, 000	$930	11, 670	$225
Black bass	2, 695	355						
Bluefish	181, 368	14, 270					125, 580	11, 190
Bowfin	200	2	200	10				
Butterfish	27, 780	507					17, 520	493
Carp	17, 836	980					700	14
Catfish and bullheads	80, 033	3, 116						
Crappie			400	60				
Croaker	1, 507, 635	23, 863					601, 350	8, 615
Drum: Red	27, 450	555					32, 450	1, 060
Eels	11, 999	520					2, 000	150
Flounders	423, 744	32, 153					52, 350	2, 655
Gizzard shad	300	3						
Harvestfish or "starfish"	252, 800	4, 592					101, 200	2, 750
Hickory shad	108, 140	6, 628					17, 650	860

Fisheries of North Carolina, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Dare		Gates		Hertford		Hyde	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
King whiting or "kingfish"	46, 857	$1, 414					10, 100	$505
Mullet	77, 347	4, 259					18, 812	1, 820
Pigfish	4, 170	110						
Pompano	4, 485	449						
Shad	1, 209, 944	222, 564	1, 065	$150	464	$65	30, 928	5, 900
Sheepshead	7, 520	443					3, 000	300
Spadefish							4, 330	400
Spanish mackerel	15, 806	1, 554					5, 300	530
Spot	299, 620	6, 009					77, 030	1, 155
Squeteagues or "sea trout"	2, 111, 953	111, 654					285, 362	14, 255
Striped bass	94, 450	14, 651	155	30			4, 270	636
Sturgeon	92	20					400	133
Suckers			120	6				
Sunfish	300	3						
White perch	29, 884	2, 352	1, 080	110	250	20	190	15
Yellow perch	5, 340	176						
Crabs: Hard	200, 000	3, 000					11, 000	200
Clams, hard	7, 432	2, 000						
Oysters:								
Market, public	23, 450	2, 400					218, 820	15, 389
Market, private	3, 031	260					826	94
Seed, public							190, 512	7, 267
Total	7, 036, 651	465, 058	43, 020	666	124, 714	1, 015	1, 823, 350	76, 611

Species	Lenoir		Martin		New Hanover		Onslow	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			504, 000	$2, 800			344, 000	$5, 500
Bluefish					606	$62	4, 000	240
Bowfin			400	28				
Carp			1, 000	60				
Catfish and bullheads	1, 000	$100	1, 400	110	7, 143	500		
Crappie	550	110						
Croaker					1, 750	35	20, 970	298
Drum: Red					4, 250	85		
Eels			500	30			4, 160	430
Flounders					17, 000	945	30, 385	1, 780
Grunts					4, 571	320	713	57
Hickory shad			1, 000	50	150	10		
King whiting or "kingfish"					3, 500	175	52, 125	2, 350
Mullet					441, 830	21, 750	470. 330	27, 805
Pigfish					8, 283	580		
Pinfish or sailors choice					2, 285	160	364	29
Porgies					1, 714	120		
Sea bass					48, 140	3, 370	31, 912	2. 490
Shad	569	135	1, 155	190	63, 553	12, 300		
Sheepshead					456	32		
Snapper: Red					1, 285	90	1, 075	86
Spanish mackerel					2, 990	432		
Spot					206, 125	8, 450	240, 890	5, 825
Squeteagues or "sea trout"					1, 636	125	52, 449	4, 835
Striped bass	140	35	3, 000	450	235	32		
Sturgeon					1, 000	200		
Sunfish	125	20						
Tautog							538	43
White perch			633	50				
Crabs:								
Hard					5, 000	150		
Soft							2, 500	300
Shrimp					37, 500	1, 500	1, 500	300
Clams, hard					12, 800	2, 400	43, 520	5, 44
Oysters:								
Market, public					21, 700	3, 075	84, 525	7, 250
Market, private							12, 481	2, 150
Squid							1, 790	143
Total	2, 384	400	513, 088	3, 768	895, 502	56, 898	1, 400, 227	67, 351

Fisheries of North Carolina, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Pamlico		Pasquotank		Pender		Perquimans	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	80, 240	$1, 665	86, 200	$1, 261			278, 200	$2, 095
Black bass			75	15				
Bluefish	2, 000	80						
Bowfin			1, 100	31				
Butterfish	9, 075	228						
Carp	3, 292	190	1, 325	56				
Catfish and bullheads			85, 090	3, 205			7, 500	150
Crappie			150	15				
Croaker	539, 530	8, 625	90, 000	1, 800				
Drum: Red	10, 475	150						
Eels	3, 000	300	1, 500	75			17, 000	700
Flounders	26, 316	1, 310	20, 800	1, 898	12, 700	$760		
Harvestfish or "starfish"	86, 850	2, 230						
Hickory shad	52, 188	2, 389	625	50			7, 400	370
King whiting or "kingfish"			4, 286	300				
Mullet	1, 750	145	100	5	180, 250	7, 390		
Pigfish	9, 000	135						
Pike			643	60				
Pompano	1, 862	140						
Shad	99, 175	19, 746	76, 641	13, 989			60, 477	8, 150
Sheepshead	1, 775	95						
Spadefish	2, 125	56						
Spanish mackerel	1, 150	110						
Spot	79, 270	1, 210			218, 780	7, 235		
Squeteagues or "sea trout"	451, 812	14, 730	1, 429	100				
Striped bass	5, 210	920	17, 383	3, 491			4, 875	975
Sunfish			2, 750	145				
White perch			16, 065	1, 075				
Yellow perch			6, 680	400				
Crabs: hard	199, 100	3, 620						
Shrimp					20, 625	625		
Clams, hard					40, 000	7, 503		
Oysters: Market, public	1, 060, 717	64, 185	26, 838	2, 875	3, 500	500		
Terrapin	3, 581	1. 596						
Turtles	6, 670	200						
Total	2, 736, 163	124, 055	439, 680	30, 846	475, 855	24, 013	375, 452	12, 440

Species	Pitt		Tyrrell		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	75, 330	$1, 130	767, 200	$13, 295	2, 014, 125	$15, 030
Bowfin			875	70		
Carp	400	20	8, 188	653		
Catfish and bullheads			26, 032	1, 485	13, 165	660
Eels			3. 100	250		
Flounders			1, 300	130		
Hickory shad	630	50	700	105	7, 012	595
Shad	2, 550	500	18, 524	2, 975	29, 256	5, 265
Striped bass			14, 730	3, 020	14, 350	2, 160
White perch			11. 920	1, 356	24, 185	1, 850
Yellow perch			15, 597	1, 872		
Total	78, 910	1, 700	868, 166	25, 211	2, 102, 093	25, 560

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 85 persons in North Carolina engaged primarily in transporting fishery products by means of vessels and boats. In this trade 33 motor vessels and 35 under-tonnage boats were operated. The vessels had a combined capacity of 349 net tons. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 68 wholesale establishments in North Carolina engaged primarily in handling fresh and frozen products. These establishments employed 358 persons, who received $164,367 in salaries and wages. Carteret County alone accounted for 30 of these establishments.

Manufacturing.—There were 22 establishments in North Carolina in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 382 persons, who received $207,599 in salaries and wages. The products manufactured, consisting principally of menhaden products, were valued at $1,165,537. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were 361 fishermen in North Carolina preparing fishery products. Their output, consisting principally of salted alewives and mullet, amounted to 3,329,082 pounds, valued at $64,998.

Industries related to the fisheries of North Carolina, 1929

TRANSPORTING

Items	Number
Persons engaged:	
On transporting vessels	50
On transporting boats	35
Total	85
Transporting vessels:	
Motor—	
5 to 10 tons	19
11 to 20 tons	12
21 to 30 tons	2
Total	33
Net tonnage	349
Transporting boats	35

WHOLESALE

Items	Beaufort County	Brunswick County	Carteret County	Currituck and Pasquotank Counties	Dare and Washington Counties	New Hanover and Pender Counties	Onslow County	Pamlico and Craven Counties	Total
Establishments	6	3	30	3	8	6	5	7	68
Persons engaged:									
Proprietors	7	3	35	4	10	6	7	10	82
Salaried employees	1	2	8	2				2	15
Wage earners	52	48	92	8	17	3	3	38	261
Paid to salaried employees	$240	$2,850	$8,700	$10,000				$1,020	$22,810
Paid to wage earners	21,665	7,900	68,522	5,850	$12,000	$1,230	$800	23,590	141,557
Total salaries and wages	21,905	10,750	77,222	15,850	12,000	1,230	800	24,610	164,367

Industries related to the fisheries of North Carolina, 1929—Continued

MANUFACTURING

Items	Number
Establishments	22
Persons engaged:	
Proprietors	32
Salaried employees	21
Wage earners	329
Paid to salaried employees	$57, 033
Paid to wage earners	150, 566
Total salaries and wages	207, 599

Products [1]	Quantity	Value
Salted:		
Alewives pounds	875, 000	$15, 187
Mullet do	748, 600	61, 940
Spot do	137, 800	10, 022
Canned:		
Oysters-standard cases [2]	19, 852	97, 102
By products:		
Menhaden—		
Dry scrap tons	4, 234	189, 663
Acid scrap do	5, 887	158, 184
Fish meal do	2, 869	158, 231
Oil gallons	753, 722	323, 904
Miscellaneous products [3]		151, 304
Total		1, 165, 537

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged number	361	
Salted products:		
Alewives pounds	3, 149, 200	$48, 791
Eels do	13, 000	1, 040
Mullet do	161, 800	14, 594
Spot do	5, 000	450
Sturgeon caviar do	82	123
Total	3, 329, 082	64, 998

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[1] Includes the production of 22 firms whose activities were principally in the wholesale trade.
[2] A standard case contains forty-eight 5-ounce cans of oysters.
[3] Includes spiced alewives, canned shrimp, canned alewife roe, and oyster-shell products.

SOUTH CAROLINA

The fisheries and industries related to the fisheries of South Carolina in 1929 employed 2,384 fishermen, which is 6 per cent less than the number employed during 1928. Of the total number of persons, 1,571 were fishermen, 124 were engaged on transporting vessels and boats, 219 in the wholesale trade, and 470 in manufacturing industries. Of the fishermen, 264 were engaged also in the manufacture of prepared fishery products.

The total catch amounted to 6,135,133 pounds, valued at $275,118, which is a decrease of 17 per cent in the catch and 13 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of oysters accounted for 46 per cent; shad, 20 per cent; mullet and sea bass, each, 8 per cent; shrimp, 6 per cent; and king whiting or "kingfish," 4 per cent. Of the total weight of the catch, that of oysters accounted for 75 per cent; mullet and shrimp, each 5 per cent; and sea bass and shad, each 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in South Carolina during 1929 was taken by 1,571 fishermen, who used 10 motor vessels, 1,042 motor and other small fishing boats, and 10 major types of gear. The vessels had a combined capacity of 112 net tons. The fisheries accounting for the greatest number of persons were the fishery with grabs employing 555 fishermen, the haul-seine fishery employing 315 fishermen, and the drift gill-net fishery employing 277 fishermen.

CATCH BY GEAR

Four types of gear accounted for 90 per cent of the fishery products taken in the fisheries of South Carolina during 1929. Listed in order of their importance they were: Grabs which accounted for 71 per cent of the catch; lines, 8 per cent; gill nets, 6 per cent; and haul seines, 5 per cent. The catch by grabs was exclusively oysters; that by lines consisted principally of sea bass and king whiting or "kingfish"; that by gill nets chiefly shad; and that by haul seines largely mullet.

OPERATING UNITS BY COUNTIES

Beaufort and Charleston Counties each accounted for 27 per cent of the total number of persons fishing. Other counties employing a considerable number of fishermen were Georgetown and Horry Counties. Ten fishing vessels were operated in the State, all of which were operated in Charleston County. Beaufort County led in the number of motor and other small fishing boats, accounting for 39 per cent of the total. Charleston County followed with 28 per cent.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of eight counties of South Carolina during 1929. Ranked according to value, the fisheries of Charleston County were most important, accounting for 42 per cent of the total catch and 43 per cent of the total value of the catch. Beaufort County was next in importance, accounting for 46 per cent of the catch and 30 per cent of the value. Other important producing counties listed in order of their importance with respect to value were Georgetown, Horry, and Colleton.

Fisheries of South Carolina, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines, common	Gill nets			Lines		Dip-nets, common
		Anchor	Drift	Run around	Hand	Trot with baits or snoods	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels					18		
On boats and shore—							
Regular	5	51	24	2	68	11	
Casual	310	194	253	18	52		10
Total	315	245	277	20	138	11	10
Vessels:							
Motor—							
5 to 10 tons					3		
Total net tonnage					26		
Boats:							
Motor		4	6		12		
Other	30	167	151	11	17	6	10
Apparatus:							
Number	30	277	149	27	244	11	10
Length, yards	4,188						
Square yards		70,765	145,250	13,010			
Hooks, baits or snoods					1,032	5,500	

Fisheries of South Carolina, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs	Rakes	Grabs	By hand	Total, exclusive, of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	30		6					42
On boats and shore—								
Regular	32	4		16		162	3	300
Casual	3	26		16	51	393	38	1, 229
Total	65	30	6	32	51	555	41	1, 571
Vessels:								
Motor—								
5 to 10 tons	6							7
11 to 20 tons	2		1					3
Total vessels	8		1					10
Total net tonnage	84		19					112
Boats:								
Motor	16							38
Other		30		32	51	564		1, 004
Apparatus:								
Number	24	30	1	32	51	515		
Yards at mouth	482		1					

CATCH: BY GEAR

Species	Haul seines, common		Gill nets					
			Anchor		Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum, red or redfish	8, 609	$500						
Flounders	900	55					625	$50
Hickory shad			400	$60	4, 500	$366		
King whiting or "kingfish"	2, 754	200						
Mullet	286, 349	17, 915					50, 180	3, 075
Shad			143, 207	31, 686	114, 964	23, 517		
Spot	19, 600	1, 030					18, 500	925
Squeteagues or "sea trout"	6, 777	575					1, 875	150
Sturgeon			8, 250	1, 938	9, 622	1, 924		
Terrapin	2, 366	1, 183						
Total	327, 355	21, 458	151, 857	33, 684	129, 086	25, 807	71, 180	4, 200

Species	Lines				Dip nets, common		Otter trawls, shrimp		Spears	
	Hand		Trot with baits or snoods							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	1, 125	$45								
Crevalle	375	30								
Croakers	6, 000	300								
Drum:										
Black	437	35								
Red or redfish	1, 916	115								
Flounders	3, 874	310							20, 000	$2, 000
Grunts	6, 374	510								
King whiting or "kingfish"	98, 000	9, 800								
Pigfish	500	50								
Pinfish or sailors choice	2, 062	185								
Porgies	250	20								
Sea bass	270, 499	21, 865								
Shad					1, 940	$413				
Sheepshead	250	20								
Squeteagues or "sea trout"	59, 367	4, 765								
Squirrelfish	437	35								
Crabs, hard			60, 000	$1, 800						
Shrimp							287, 711	$16, 625		
Octopus	937	75								
Total	452, 403	38, 160	60, 000	1, 800	1, 940	413	287, 711	16, 625	20, 000	2, 000

Fisheries of South Carolina, 1929—Continued

CATCH: BY GEAR—Continued

Species	Dredges, oyster		Tongs		Rakes		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard			1,600	$228	18,600	$2,437				
Oyster:										
Market, public			24,360	983	8,400	600	3,673,492	$97,024		
Market, private	140,000	$4,000	70,329	3,434			691,530	19,620		
Terrapin									5,290	$2,645
Total	140,000	4,000	96,289	4,645	27,000	3,037	4,365,022	116,644	5,290	2,645

OPERATING UNITS: BY COUNTIES

Items	Beaufort	Charleston	Colleton	Dorchester	Georgetown	Horry	Jasper	Orangeburg
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		42						
On boats and shore—								
Regular	56	213	7		24			
Casual	365	172	63	4	341	259	15	10
Total	421	427	70	4	365	259	15	10
Vessels:								
5 to 10 tons		7						
11 to 20 tons		3						
Total vessels		10						
Total net tonnage		112						
Boats:								
Motor		27	2		9			
Other	404	262	52	4	194	65	15	8
Apparatus:								
Haul seines, common	7	5			3	15		
Length, yards	455	333			580	2,820		
Gill nets—								
Anchor	46	69	108	5	40			9
Square yards	11,040	14,490	23,615	1,050	18,680			1,890
Drift	15	33			101			
Square yards	8,100	34,320			102,830			
Runaround					27			
Square yards					13,010			
Lines—								
Hand		212			20	12		
Hooks		904			80	48		
Trot, with baits or snoods		11						
Baits or snoods		5,500						
Dip nets, common						10		
Otter trawls, shrimp		23			1			
Yards at mouth		462			20			
Spears					30			
Dredges, oyster		1						
Yards at mouth		1						
Tongs	10	16				6		
Rakes					14	37		
Grabs	361	139					15	

Fisheries of South Carolina, 1929—Continued

CATCH: BY COUNTIES

Species	Beaufort		Charleston		Colleton		Dorchester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			1,125	$45				
Crevalle			375	30				
Croakers			6,000	300				
Drum:								
Black			437	35				
Red or redfish			1,916	115				
Flounders			3,874	310				
Grunts			6,374	510				
Hickory shad	1,000	$150	400	48				
King whiting or "kingfish"			98,000	9,800				
Porgies			250	20				
Sea bass			251,749	20,090				
Shad	28,814	5,989	56,400	13,020	58,953	$13,438	1,025	$232
Sheepshead			250	20				
Squeteagues or "sea trout"			58,430	4,675				
Squirrelfish			437	35				
Sturgeon					8,250	1,938		
Crabs, hard			60,000	1,800				
Shrimp			280,568	16,125				
Clams, hard			400	63				
Oysters:								
Market, public	2,730,294	70,295	914,582	26,350				
Market, private	69,538	2,208	832,321	24,846				
Octopus			937	75				
Terrapin	5,604	2,802	2,052	1,026				
Total	2,835,250	81,444	2,576,877	119,338	67,203	15,376	1,025	232

Species	Georgetown		Horry		Jasper		Orangeburg	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum, red or redfish	5,375	$330	3,234	$170				
Flounders	20,625	2,050	900	55				
Hickory shad	3,500	228						
King whiting or "kingfish"	330	30	2,424	170				
Mullet	74,340	4,625	262,189	16,365				
Pigfish			500	50				
Pinfish or sailors choice	1,062	85	1,000	100				
Sea bass	5,000	400	13,750	1,375				
Shad	109,289	21,687	1,940	413			3,690	$837
Spot	19,300	965	18,800	990				
Squeteagues or "sea trout"	5,517	515	4,072	300				
Sturgeon	9,622	1,924						
Shrimp	7,143	500						
Clams, hard	2,400	210	17,400	2,392				
Oysters, market, public	8,400	600			52,976	$1,362		
Total	271,903	34,149	326,209	22,380	52,976	1,362	3,690	837

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 124 persons in South Carolina engaged primarily in transporting fishery products by means of vessels and boats. In this trade 10 motor vessels, 40 sailing vessels, and 16 undertonnage boats were operated. The vessels had a combined capacity of 494 net tons. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 22 wholesale establishments in South Carolina engaged primarily in handling fresh and frozen products. These establishments employed 219 persons, who received $57,717 in salaries and wages. Beaufort County alone accounted for 14 of these establishments.

Manufacturing.—There were 19 establishments in South Carolina in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 470 persons, who received $220,353 in salaries and wages. The products manufactured, consisting principally of canned oysters, canned shrimp, and oyster-shell products, were valued at $1,024,331. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were 264 fishermen in South Carolina preparing fishery products. Their output, consisting principally of salted mullet, amounted to 159,700 pounds, valued at $14,890.

Industries related to the fisheries of South Carolina, 1929

TRANSPORTING

Items	Number
Persons engaged:	
On transporting vessels	92
On transporting boats	32
Total	124
Transporting vessels:	
Motor—	
5 to 10 tons	5
11 to 20 tons	5
Total	10
Net tonnage	107

Items	Number
Transporting vessels—Continued.	
Sail—	
5 to 10 tons	29
11 to 20 tons	9
21 to 30 tons	2
Total	40
Net tonnage	387
Total vessels	50
Total net tonnage	494
Transporting boats	16

WHOLESALE

Items	Beaufort County	Charleston and Jasper Counties	Horry and Georgetown Counties	Total
Establishments	14	5	3	22
Persons engaged:				
Proprietors	12	5	4	21
Salaried employees	5	4		9
Wage earners	146	37	6	189
Paid to salaried employees	$6,550	$6,000		$12,550
Paid to wage earners	26,707	18,160	$300	45,167
Total salaries and wages	33,257	24,160	300	57,717

MANUFACTURING

Items	Number
Establishments	19
Persons engaged:	
Proprietors	13
Salaried employees	17
Wage earners	440
Paid to salaried employees	$43,760
Paid to wage earners	176,593
Total salaries and wages	220,353

Products	Quantity	Value
Canned:		
Oysters .... standard cases [1]	106,642	$588,195
Shrimp—		
Dry pack, tins .... do	1,689	9,315
Wet pack, tins .... do	34,657	191,921
Wet pack, glass .... do	7,217	79,050
Oyster-shell products:		
Poultry food .... tons	10,822	108,217
Lime .... do	459	3,265
Other products [2]		44,368
Total		1,024,331

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[1] A standard case contains forty-eight 5-ounce cans of oysters, forty-eight 5-ounce cans in the dry pack, or forty-eight 5¾-ounce cans in the wet pack of shrimp.

[2] Includes canned hard clams, salted mullet, sturgeon caviar, and menhaden products.

Industries related to the fisheries of South Carolina, 1929

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged .... Number..	264	....
Salted products:		
Mullet .... Pounds..	159,580	$14,800
Sturgeon caviar .... do....	120	90
Total	159,700	14,890

GEORGIA

The fisheries and industries related to the fisheries of Georgia in 1929 employed 1,890 fishermen, which is 65 per cent less than the number employed during 1928. Of the total number of persons, 1,180 were fishermen, 17 were employed on transporting boats, 285 in the wholesale trade, and 408 in manufacturing industries.

The total catch amounted to 43,513,641 pounds valued at $877,232, which is an increase of 3 per cent in the catch and 1 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, shrimp accounted for 66 per cent; shad, 13 per cent; and menhaden, 12 per cent. Of the total weight of the catch, that of menhaden accounted for 67 per cent and shrimp 28 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Georgia during 1929 was taken by 1,180 fishermen who used 26 motor vessels, 681 motor and other small fishing boats, and 11 major types of gear. The vessels had a combined capacity of 349 net tons. The fisheries accounting for the greatest number of persons were the otter-trawl fishery employing 345 fishermen and the drift gill-net fishery employing 332 fishermen.

CATCH BY GEAR

Two types of gear accounted for 96 per cent of the fishery products taken in the fisheries of Georgia during 1929. Listed in order of their importance they were: Purse seines, which accounted for 67 per cent of the catch; and otter trawls, which accounted for 29 per cent. The catch by purse seines consisted entirely of menhaden and that by otter trawls principally shrimp.

OPERATING UNITS BY COUNTIES

Chatham County ranked foremost in the number of persons fishing, accounting for 41 per cent of the total. Glynn County followed with 24 per cent. Other counties employing a considerable number of fishermen listed in order of their importance in this respect were Camden, McIntosh, and Bryan. Glynn County and Chatham County each accounted for 38 per cent of the total number of fishing vessels. Chatham County led in the number of motor and other small fishing boats, accounting for 46 per cent of the total. Glynn County followed with 24 per cent.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of 13 counties of Georgia during 1929. Ranked according to value, the fisheries of Glynn County were most important, accounting for 17 per cent of the total catch and 39 per cent of the total value of the catch. Chatham County was next in importance, accounting for 8 per cent of the catch and 26 per cent of the value. Other important producing counties listed in order of their importance with respect to value of the catch were Camden and McIntosh.

Fisheries of Georgia, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines, menhaden	Haul seines, common	Gill nets			Lines		Fyke nets
			Anchor	Drift	Run-around	Hand	Trot with baits or snoods	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	90	----	----	----	----	8	----	----
On boats and shore—								
Regular	----	10	----	39	10	----	3	15
Casual	----	24	120	293	29	----	30	----
Total	90	34	120	332	39	8	33	15
Vessels:								
Motors—								
11 to 20 tons	----	----	----	----	----	1	----	----
41 to 50 tons	1	----	----	----	----	----	----	----
51 to 60 tons	1	----	----	----	----	----	----	----
61 to 70 tons	1	----	----	----	----	----	----	----
Total vessels	3	----	----	----	----	1	----	----
Total net tonnage	166	----	----	----	----	14	----	----
Boats:								
Motor	----	----	----	1	----	----	----	1
Other	----	14	93	177	27	----	33	13
Accessory boats	6	----	----	----	----	4	----	----
Apparatus:								
Number	3	16	122	179	39	8	137	50
Length, yards	1, 500	1, 603	----	----	----	----	----	----
Square yards	----	----	34, 694	242, 881	13, 824	----	----	----
Hooks, baits or snoods	----	----	----	----	----	16	1, 882	----

Items	Cast nets	Otter trawls, shrimp	Traps, crab	Tongs	Rakes	Grabs	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	----	49	----	----	----	----	----	147
On boats and shore—								
Regular	----	292	3	2	----	2	10	355
Casual	40	4	2	79	5	104	45	678
Total	40	345	5	81	5	106	55	1, 180
Vessels:								
Motors—								
5 to 10 tons	----	21	----	----	----	----	----	21
11 to 20 tons	----	1	----	----	----	----	----	2
41 to 50 tons	----	----	----	----	----	----	----	1
51 to 60 tons	----	----	----	----	----	----	----	1
61 to 70 tons	----	----	----	----	----	----	----	1
Total vessels	----	22	----	----	----	----	----	26
Total net tonnage	----	169	----	----	----	----	----	349
Boats:								
Motor	----	145	----	20	----	----	----	167
Other	40	----	5	61	5	98	27	514
Accessory boats	----	----	----	----	----	----	----	10
Apparatus:								
Number	40	167	25	81	5	106	----	----
Yards at mouth	----	3, 546	----	----	----	----	----	----

Fisheries of Georgia, 1929—Continued

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines, common		Gill nets					
					Anchor		Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croakers	----------	--------	500	$40	--------	------	--------	------	8, 250	$525
Drum, red	----------	--------	--------	------	--------	------	--------	------	4, 250	350
Flounders	----------	--------	125	10	--------	------	--------	------	2, 135	175
Hickory shad	----------	--------	--------	------	41, 300	$6, 456	9, 105	$1, 093	--------	------
Menhaden	29, 212, 800	$107, 679	--------	------	--------	------	--------	------	--------	------
Mullet	----------	--------	10, 000	400	--------	------	--------	------	61, 663	3, 400
Shad	----------	--------	--------	------	70, 864	17, 689	400, 943	94, 573	--------	------
Sheepshead	----------	--------	--------	------	--------	------	--------	------	1, 275	105
Spot	----------	--------	937	75	--------	------	--------	------	4, 833	370
Squeteagues or "sea trout"	----------	--------	937	75	--------	------	--------	------	36, 000	3, 800
Sturgeon	----------	--------	--------	------	--------	------	4, 866	803	--------	------
Terrapin	----------	--------	10, 094	3, 261	--------	------	--------	------	--------	------
Total	29, 212, 800	107, 679	22, 593	3, 861	112, 164	24, 145	414, 914	96, 469	118, 406	8, 725

Species	Lines				Fyke nets		Cast nets		Otter trawls, shrimp	
	Hand		Trot with baits or snoods							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	27, 567	$5, 238	--------	------	--------	------	--------	------	----------	--------
Catfish and bullheads	--------	------	--------	------	240, 000	$9, 600	--------	------	----------	--------
Croakers	--------	------	--------	------	--------	------	--------	------	6, 300	$140
Flounders	--------	------	--------	------	--------	------	--------	------	400	13
Groupers	8, 275	496	--------	------	--------	------	--------	------	----------	--------
Jewfish	1, 473	74	--------	------	--------	------	--------	------	----------	--------
King whiting or "kingfish"	--------	------	--------	------	--------	------	--------	------	51, 500	1, 245
Mullet	--------	------	--------	------	--------	------	50, 000	$2, 500	----------	--------
Sea bass	41, 988	3, 747	--------	------	--------	------	--------	------	----------	--------
Snapper, red	32, 983	2, 804	--------	------	--------	------	--------	------	----------	--------
Spot	--------	------	--------	------	--------	------	--------	------	6, 080	133
Squeteagues or "sea trout"	--------	------	--------	------	--------	------	--------	------	820	24
Crabs, hard	--------	------	150, 000	$4, 313	--------	------	--------	------	----------	--------
Shrimp	--------	------	--------	------	--------	------	--------	------	12, 377, 619	581, 015
Total	112, 286	12, 359	150, 000	4, 313	240, 000	9, 600	50, 000	2, 500	12, 442, 719	582, 570

Species	Traps, crab		Tongs		Rakes		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard	75, 000	$1, 500	--------	------	--------	------	--------	------	--------	------
Clams, hard	--------	------	--------	------	1, 800	$280	--------	------	--------	------
Oysters:										
Market, public	--------	------	35, 770	$1, 278	--------	------	137, 697	$4, 328	18, 655	$933
Market, private	--------	------	122, 465	5, 211	--------	------	197, 743	6, 662	38, 535	1, 558
Terrapin	--------	------	--------	------	--------	------	--------	------	10, 094	3, 261
Total	75, 000	1, 500	158, 235	6, 489	1, 800	280	335, 440	10, 990	67. 284	5, 752

Fisheries of Georgia, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Bryan	Bullock	Camden	Charlton	Chatham	Effingham
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	--------	--------	93	--------	29	--------
On boats and shore—						
Regular	--------	--------	50	--------	99	--------
Casual	57	8	23	18	351	4
Total	57	8	166	18	479	4
Vessels:						
Motor—						
5 to 10 tons	--------	--------	1	--------	8	--------
11 to 20 tons	--------	--------	--------	--------	2	--------
41 to 50 tons	--------	--------	1	--------	--------	--------
51 to 60 tons	--------	--------	1	--------	--------	--------
61 to 70 tons	--------	--------	1	--------	--------	--------
Total vessels	--------	--------	4	--------	10	--------
Total net tonnage	--------	--------	175	--------	86	--------
Boats:						
Motor	--------	--------	26	--------	58	--------
Other	31	8	23	9	253	4
Accessory boats	--------	--------	6	--------	4	--------
Apparatus:						
Purse seines, menhaden	--------	--------	3	--------	--------	--------
Length, yards	--------	--------	1, 500	--------	--------	--------
Haul seines, common	--------	--------	--------	--------	4	--------
Length, yards	--------	--------	--------	--------	300	--------
Gill nets—						
Anchor	5	8	--------	--------	30	4
Square yards	1, 910	3, 056	--------	--------	14, 250	1, 528
Drift	26	--------	23	9	85	--------
Square yards	83, 200	--------	8, 281	2, 700	127, 500	--------
Runaround	--------	--------	--------	--------	14	--------
Square yards	--------	--------	--------	--------	3, 900	--------
Lines—						
Hand	--------	--------	--------	--------	8	--------
Hooks	--------	--------	--------	--------	16	--------
Trot with baits or snoods	--------	--------	--------	--------	132	--------
Baits or snoods	--------	--------	--------	--------	132	--------
Cast nets	--------	--------	--------	--------	20	--------
Otter trawls, shrimp	--------	--------	26	--------	47	--------
Yards at mouth	--------	--------	524	--------	992	--------
Tongs	--------	--------	81	--------	--------	--------
Rakes	--------	--------	5	--------	--------	--------
Grabs	--------	--------	75	--------	--------	15

Items	Glynn	Liberty	Long	McIntosh	Screven	Tattnall	Wayne
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	21	--------	--------	4	--------	--------	--------
On boats and shore—							
Regular	149	2	--------	55	--------	--------	--------
Casual	113	15	6	23	3	32	25
Total	283	17	6	82	3	32	25
Vessels:							
Motor—							
5 to 10 tons	10	--------	--------	2	--------	--------	--------
Net tonnage	72	--------	--------	16	--------	--------	--------
Boats:							
Motor	62	1	--------	20	--------	--------	--------
Other	100	15	3	32	3	18	15
Apparatus:							
Haul seines, common	12	--------	--------	--------	--------	--------	--------
Length, yards	1, 303	--------	--------	--------	--------	--------	--------
Gill nets—							
Anchor	12	--------	5	--------	3	30	25
Square yards	1, 584	--------	910	--------	1, 446	5, 460	4, 550
Drift	24	--------	--------	12	--------	--------	--------
Square yards	7, 900	--------	--------	13, 300	--------	--------	--------
Runaround	22	--------	--------	3	--------	--------	--------
Square yards	9, 174	--------	--------	750	--------	--------	--------
Lines—							
Trot with baits or snoods	5	--------	--------	--------	--------	--------	--------
Baits or snoods	1, 750	--------	--------	--------	--------	--------	--------
Fyke nets	--------	--------	--------	50	--------	--------	--------
Cast nets	20	--------	--------	--------	--------	--------	--------
Otter trawls, shrimp	72	1	--------	21	--------	--------	--------
Yards at mouth	1, 574	20	--------	436	--------	--------	--------
Traps, crab	25	--------	--------	--------	--------	--------	--------
Grabs	16	--------	--------	--------	--------	--------	--------

Fisheries of Georgia, 1929—Continued

CATCH: BY COUNTIES

Species	Bryan		Bullock		Camden		Charlton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Menhaden					29,212,800	$107,679		
Shad	36,750	$9,649	3,600	$930	17,014	3,300	11,700	$2,250
Shrimp					1,953,820	101,945		
Total	36,750	9,649	3,600	930	31,183,634	212,924	11,700	2,250

Species	Chatham		Effingham		Glynn		Liberty	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	27,567	$5,238						
Croaker	1,300	40			13.750	$665		
Drum, red					4,250	350		
Flounders	400	13			2,260	185		
Groupers	8,275	496						
Hickory shad	37,500	6,000			6,880	826		
Jewfish	1,473	74						
King whiting or "kingfish"	21,500	645			30 000	600		
Mullet	74,830	4,250			40,833	1,750		
Sea bass	41,988	3,747						
Shad	296.168	72,390	1,800	$465	71,061	15,315		
Sheepshead					1,275	105		
Snapper, red	32,983	2,804						
Spot	1,913	83			9,937	495		
Squeteagues or "sea trout"	820	24			36.937	3,875		
Sturgeon	2,433	365						
Crabs, hard	75,000	2,813			150,000	3,000		
Shrimp	2,407,921	117,343			6,895,402	311,206	47,000	$2,115
Clams, hard	1,800	280						
Oysters:								
Market, public	173,467	5,606			18,655	933		
Market, private	189,826	7,532			18,655	933	78,505	2,403
Terrapin	2,642	1,212			17,546	5,310		
Total	3,399.806	230,955	1,800	465	7,317,441	345,548	125,505	4,518

Species	Long		McIntosh		Screven		Tattnall		Wayne	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			240,000	$9,600						
Hickory shad	250	$30	3,025	363			1,500	$180	1,250	$150
Mullet			6,000	300						
Shad	1,410	355	14,300	3,410	1,350	$293	9,600	2,130	7,054	1,775
Sturgeon			2,433	438						
Shrimp			1,073,476	48,406						
Oysters: Market, private			71,757	2,563						
Total	1,660	385	1,410,991	65,080	1,350	293	11,100	2,310	8,304	1.925

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 17 persons in Georgia engaged primarily in transporting fishery products by means of boats. In this trade 15 boats were operated.

Wholesale.—There were 32 wholesale establishments in Georgia engaged primarily in handling fresh and frozen products. These establishments employed 285 persons, who received $157,029 in salaries and wages.

Manufacturing.—There were 11 establishments in Georgia in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 408 persons, who received $164,789 in salaries and wages. The products manufactured, consisting principally of canned shrimp and oysters, and menhaden products, were valued at $957,437. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Industries related to the fisheries of Georgia, 1929

TRANSPORTING

Items	Number
Persons engaged on transporting boats	17
Transporting boats	15

WHOLESALE

Items	Chatham and Liberty Counties	Glynn and Camden Counties	Total
Establishments	20	12	32
Persons engaged:			
Proprietors	20	11	31
Salaried employees	16	1	17
Wage earners	127	110	237
Paid to salaried employees	$57,220	$400	$57,620
Paid to wage earners	61,169	38,240	99,409
Total salaries and wages	118,389	38,640	157,029

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	11	Canned:		
Persons engaged:		Oysters standard cases [2]	18,258	$92,540
Proprietors	12	Shrimp—		
Salaried employees	11	Dry pack, tins do	28,291	183,108
Wage earners	385	Wet pack, tins do	78,858	458,938
		Wet pack, glass do	3,636	39,825
Paid to salaried employees	$27,390	Other products [3]		183,026
Paid to wage earners	137,399			
		Total		957,437
Total salaries and wages	164,789			

[1] Includes pickled shrimp prepared by one firm whose activities were principally in the wholesale fishery trade.

[2] A standard case contains forty-eight 5-ounce cans of oysters, forty-eight 5-ounce cans in dry pack, or forty-eight 5¾-ounce cans in the wet pack of shrimp.

[3] Includes canned hard clam chowder, canned terrapin soup and meat, pickled shrimp in vinegar and menhaden products.

FLORIDA

The fisheries and industries related to the fisheries of Florida in 1929 employed 10,918 fishermen, which is 1 per cent more than the number employed in 1928. Of the total number of persons, 9,003 were fishermen, 41 were employed on transporting vessels, 1,387 in the wholesale trade, and 487 in manufacturing industries. Of the fishermen, 127 were engaged also in the manufacture of prepared fishery products.

The total catch amounted to 145,953,078 pounds, valued at $6,119, 947, which is an increase of 11 per cent in the catch and a decrease of 2 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, mullet accounted for 18 per cent; sponges and shrimp, each 14 per cent; and red snapper, 10 per cent. Of the total weight of the catch, that of menhaden accounted for 35 per cent; mullet, 19 per cent; shrimp, 13 per cent; red snapper, 5 per cent; and Spanish mackerel, and catfish and bullheads, each 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Florida during 1929 was taken by 9,003 fishermen, who used 106 motor vessels, 8 sailing vessels, 6,573 motor and other small fishing boats, and 19 major types of gear. The vessels had a combined capacity of 3,897 net tons. The fisheries accounting for the greatest number of persons were the fishery with runaround gill nets, employing 2,498 fishermen, and the hand-line fishery, employing 1,950 fishermen.

CATCH BY GEAR

Five types of gear accounted for 95 per cent of the fishery products taken in the fisheries of Florida (including Lake Okeechobee) during 1929. Listed in order of their importance, they were: Purse seines, which accounted for 35 per cent of the catch; gill nets, 23 per cent; lines, 13 per cent; otter trawls, 13 per cent; and haul seines, 10 per cent. The catch by purse seines was almost exclusively menhaden; that by gill nets was principally mullet, Spanish mackerel, and squeteagues or "sea trout"; that by lines was principally red snapper, kingfish or "king mackerel" and groupers; that by otter trawls was principally shrimp; and that by haul seines chiefly mullet and catfish and bullheads.

OPERATING UNITS BY COUNTIES

Pinellas County led in the number of persons fishing, accounting for 12 per cent of the total. Escambia County followed, with 8 per cent. Other counties employing a considerable number of fishermen were: Monroe, Franklin, Charlotte, and Bay. Escambia County accounted for 32 per cent of the total number of fishing vessels and Bay County accounted for 16 per cent. Charlotte County led in the number of motor and other small fishing boats, accounting for 9 per cent of the total. Monroe and Pinellas Counties followed, each accounting for 8 per cent.

CATCH BY COUNTIES

Fishing was prosecuted in the waters of 39 counties in Florida (including Lake Okeechobee) during 1929. Ranked according to value the fisheries of Pinellas County were most important, accounting for 4 per cent of the catch and 18 per cent of the value of the catch. Escambia County was next in importance, accounting for 5 per cent of the catch and 8 per cent of the value. Other important counties, listed in order of their importance, with respect to the value of the catch, were: Nassau, Franklin, St. John, and Monroe.

CATCH BY DISTRICTS

Considered according to value of products taken during 1929, the west coast of Florida was by far the most important district in that State, accounting for 49 per cent of the total quantity and 63 per cent of the total value. The east coast of Florida accounted for 48 per cent of the total quantity and 34 per cent of the total value. Lake Okeechobee accounted for 3 per cent each of the quantity and value.

Fisheries of Florida, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines		Haul seines		Gill nets			
	Menhaden	Other	Common	Long	Anchor	Drift	Run-around	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	205	20						
On boats and shore—								
Regular	48		842	335	12	273	2, 488	
Casual			4				10	20
Total	253	20	846	335	12	273	2, 498	20
Vessels:								
Motor—								
11 to 20 tons	2	1						
21 to 30 tons	1							
31 to 40 tons	2							
41 to 50 tons	1	1						
51 to 60 tons	1							
61 to 70 tons	1							
81 to 90 tons	1							
151 to 160 tons	1							
Total	10	2						
Net tonnage	535	54						
Boats:								
Motor	8		170	124	4	104	1, 121	
Other			86	218		144	2, 030	20
Accessory boats	14	4						
Apparatus:								
Number	18	2	169	87	8	216	2, 574	60
Length, yards	5, 523	600	66, 920	69, 700				
Square yards					2, 400	404, 000	3, 230, 365	3, 900

Items	Trammel nets	Lines				Pound nets	Stop nets	Fyke nets
		Hand	Troll	Trot with baits or snoods	Trot with hooks			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		573	7					
On boats and shore—								
Regular	201	793	1, 138	9	274	46	5	64
Casual		584	89					
Total	201	1, 950	1, 234	9	274	46	5	64
Vessels:								
Motor—								
5 to 10 tons		12	1					
11 to 20 tons		15						
21 to 30 tons		4						
31 to 40 tons		3						
41 to 50 tons		8						
51 to 60 tons		7						
61 to 70 tons		12						
71 to 80 tons		3						
91 to 100 tons		1						
101 to 110 tons		1						
Total		66	1					
Net tonnage		2, 466	10					
Sail—								
51 to 60 tons		1						
61 to 70 tons		3						
131 to 140 tons		1						
141 to 150 tons		1						
Total		6						
Net tonnage		527						
Total vessels		72	1					
Total net tonnage		2, 993	10					
Boats:								
Motor	106	485	750	5	17	19	1	29
Other	91	453	6	4	255	24		46
Apparatus:								
Number	142	1, 923	1, 756	9	274	47	1	2, 980
Square yards	117, 642						2, 000	
Hooks, baits or snoods		3, 124	2, 699	2, 350	112, 600			

Fisheries of Florida, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Dip nets	Cast nets	Otter trawls, shrimp	Wire baskets	Pots			Spears
					Crab	Eel	Sea crawfish	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			98					
On boats and shore—								
Regular	98	2	820	50	85	2	78	32
Casual	27	32			2			25
Total	125	34	918	50	87	2	78	57
Vessels:								
Motor—								
5 to 10 tons			14					
11 to 20 tons			9					
21 to 30 tons			1					
Total			24					
Net tonnage			263					
Boats:								
Motor	55		362		51	2	42	
Other	75	24		50	44		33	
Apparatus:								
Number	125	34	386	550	3,814	100	2,794	57
Yards at mouth			7,461					

Items	Dredges, clam	Tongs	Forks	Hooks		Diving outfits	By hand	Total, exclusive of duplication
				Sea crawfish	Sponge			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		2			41			909
On boats and shore—								
Regular	12	415	63	110	418	396	56	7,248
Casual		25		22			96	846
Total	12	442	63	132	459	396	152	9,003
Vessels:								
Motor—								
5 to 10 tons		1			2			29
11 to 20 tons					2			28
21 to 30 tons					1			6
31 to 40 tons								5
41 to 50 tons								10
51 to 60 tons								8
61 to 70 tons								13
71 to 80 tons								3
81 to 90 tons								1
91 to 100 tons								1
101 to 110 tons								1
151 to 160 tons								1
Total		1			5			106
Net tonnage		6			60			3,345
Sail—								
5 to 10 tons					1			1
11 to 20 tons					1			1
51 to 60 tons								1
61 to 70 tons								3
131 to 140 tons								1
141 to 150 tons								1
Total					2			8
Net tonnage					25			552
Total vessels		1			7			114
Total net tonnage		6			85			3,897
Boats:								
Motor		137	4	60	106	52	4	2,855
Other		173	61	82	254		40	3,718
Accessory boats					24			42
Apparatus:								
Number	1	440	61	132	278	51	104	

Fisheries of Florida, 1929—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							406, 429	$4, 074
Black bass							241, 307	23, 881
Bluefish			33, 141	$1, 988	151, 242	$7, 301		
Bluerunner or hardtail			6, 344	191	204, 494	3, 215		
Bonito					3, 915	97		
Cabio or crab eater					44	1		
Catfish and bullheads					35, 438	1, 418	4, 076, 874	179, 591
Cigarfish					89, 100	2, 673		
Crappie							775, 680	32, 752
Crevalle					67, 278	1, 969		
Croaker					21, 823	644		
Drum:								
Black					13, 293	407		
Red or redfish					189, 170	7, 569	753	30
Eels							150	8
Flounders					44, 946	2, 648		
Hickory shad							31, 517	946
Jewfish					1, 500	30		
Kingfish or "king mackerel"					7, 384	326		
King whiting or "kingfish"					24, 345	786		
Menhaden	50, 477, 580	$316, 250			54, 400	1, 262		
Majarro					319, 725	11, 970		
Moonfish					110	3		
Mullet			115, 339	2, 984	4, 949, 432	193, 953		
Muttonfish					5, 150	155		
Permit					13, 146	426		
Pigfish					23, 471	763		
Pinfish or sailors choice					6, 700	208		
Pompano					67, 027	11, 919		
Sea bass					855	34		
Shad							152, 408	18, 350
Sheepshead					158, 459	6, 391		
Snapper: Mangrove					34, 787	1, 384		
Snook or sergeantfish			750	23	250, 887	10, 113		
Spadefish					75, 129	2, 284		
Spanish mackerel			20, 674	1, 447	684, 224	35, 441		
Spot					48, 641	1, 566		
Squeteagues or "sea trout"					481, 553	41, 077		
Sturgeon					57	6		
Sunfish							398, 463	11, 944
Tenpounder					278, 645	6, 637		
Yellowtail					16, 950	533		
Shrimp	15, 000	600						
Turtles					457	7	15, 031	332
Total	50, 492, 580	316, 850	176, 248	6, 633	8, 323, 777	355, 216	6, 098, 612	271, 908

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pound*	*Value*
Amberjack					300	$9		
Barracuda					2, 150	65		
Bluefish					641, 253	68, 815		
Bluerunner or hardtail					215, 136	3, 868		
Catfish and bullheads					54, 394	2, 896		
Crevalle			680	$20	159, 563	4, 840		
Croaker			2, 982	125	30, 510	915		
Drum:								
Black					54, 865	1, 455		
Red or redfish			2, 800	140	678, 146	26, 855		
Flounders					25, 792	1, 499		
Hickory shad			9, 734	292				
Kingfish or "king mackerel"					9, 100	610		
King whiting or "kingfish"			32, 400	1, 296	109, 915	4, 340		
Mojarro					225, 453	9, 845		
Mullet			178, 390	8, 879	21, 397, 972	818, 686		
Muttonfish					7, 000	210		
Permit					4, 650	140		
Pigfish					98, 457	2, 222		
Pinfish or sailors choice					131, 970	2, 868		
Pompano			100	25	213, 975	50, 418		

Fisheries of Florida, 1929—Continued

CATCH: BY GEAR—Continued

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Porgies					590	$12		
Sea bass					13, 197	600		
Shad			527, 818	$79, 173			21, 000	$3, 780
Sharks	176, 000	$2, 200						
Sheepshead			200	10	489, 411	18, 995		
Snapper: Mangrove					111, 816	4, 748		
Snook or sergeantfish					266, 433	11, 475		
Spadefish					3, 933	119		
Spanish mackerel					4, 553, 752	285, 225		
Spot					220, 719	6, 702		
Squeteagues or "sea trout"			12, 688	1, 250	2, 155, 766	180, 261		
Sturgeon			6, 119	857	5, 230	951		
Yellowtail					7, 800	500		
Turtles	12, 000	960						
Total	188, 000	3, 160	773, 911	92, 067	31, 889, 248	1, 510, 144	21, 000	3, 780

Species	Trammel nets		Lines							
			Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack			43, 802	$1, 522						
Barracuda					15, 210	$456				
Bluefish	4, 720	$260	44, 369	4, 788	171, 756	19, 434				
Bluerunner or hardtail			2, 600	78	3, 000	110				
Bonito	220	8								
Cabio or crab eater			7, 550	239						
Catfish and bullheads									722, 086	$34, 931
Cero					14, 800	642				
Crevalle			12, 400	432	3, 500	113				
Croaker			500	20						
Dolphin			5, 000	500						
Drum:										
Black	1, 485	40	9, 769	342						
Red or redfish	11, 556	610	274, 837	11, 163						
Flounders	4, 026	326	8, 000	414						
Groupers			4, 126, 593	126, 790	1, 500	90				
Grunts			60, 973	2, 230						
Hogfish			3, 600	108						
Jewfish			82, 916	4, 546						
Kingfish or "king mackerel"	110	6	1, 110, 634	55, 716	3, 195, 470	168, 931				
King whiting or "kingfish"	4, 433	161	13, 400	1, 044						
Mullet	1, 204, 590	48, 184								
Muttonfish			192, 682	16, 305	8, 800	880				
Pinfish or sailors choice			400	14						
Pompano	191, 374	38, 179	8, 100	1, 985						
Porgies			157, 033	4, 667						
Porkfish			500	15						
Sea bass			74, 801	6, 557						
Sheepshead	20, 362	930	287, 530	11, 541						
Snapper:										
Mangrove	2, 090	76	111, 531	7, 821						
Red			7, 718, 724	619, 646						
Snook or sergeantfish			61, 726	2, 602	400	16				
Spadefish			200	6						
Spanish mackerel	1, 364	64	35, 100	3, 076	565, 705	35, 963				
Spot	1, 760	63	300	15						
Squeteagues or "sea trout"	86, 277	7, 506	919, 059	85, 297						
Tripletail			10, 150	406						
Turbot			200	6						
Yellowtail			145, 000	11, 636	500	30				
Crabs: Hard							46, 400	$1, 724		
Total	1, 534, 367	96, 413	15, 529, 979	981, 527	3, 980, 641	226, 665	46, 400	1, 724	722, 086	34, 931

Fisheries of Florida, 1929—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Stop nets		Fyke nets		Dip nets		Cast nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	587	$70								
Alewives	1, 800	27								
Black bass					183, 189	$18, 159				
Bluefish	75, 721	4, 130								
Bluerunner or hardtail	363, 605	6, 611			7, 300	146				
Bonito	4, 400	160								
Cabio or crab eater	2, 310	63								
Catfish and bullheads	226, 974	10, 214			40, 600	1, 827				
Crappie	28, 750	862			199, 100	5, 973				
Crevalle	704	19								
Drum:										
Black	1, 067	39								
Red or redfish	31, 068	1, 130	12, 000	$480						
Groupers	2, 697	98			14, 500	580				
Grunts					10, 200	408				
Jewfish	3, 087	112								
Kingfish or "king mackerel"	13, 200	720								
Mojarro									4, 800	$336
Mullet			22, 000	880					57, 400	1, 946
Muttonfish					12, 000	960				
Pompano	1, 482	370								
Porgies	860	17								
Sheepshead	2, 807	102	1, 500	60						
Snapper: Mangrove	3, 032	110								
Spanish mackerel	104, 272	5, 688								
Squeteagues or "sea trout"	256, 775	23, 343	8, 000	720						
Sturgeon	1, 777	323								
Sunfish	38, 427	1, 153			67, 077	2, 012				
Crabs:										
Hard							1, 824	$114		
Stone							2, 840	256		
Sea crawfish or spiny lobster							147, 704	11, 726		
Total	1, 165, 402	55, 361	43, 500	2, 140	533, 966	30, 065	152, 368	12, 096	62, 200	2, 282

Species	Otter trawls, shrimp		Wire baskets		Pots					
					Crab		Eel		Sea crawfish	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			99, 715	$5, 983						
Croaker	15, 870	$445								
Drum:										
Black	3, 010	97								
Red or redfish	8, 425	265								
Eels							19, 468	$973		
Flounders	9, 140	482								
King whiting or "kingfish"	480, 450	14, 423								
Spot	4, 820	144								
Squeteagues or "sea trout"	11, 140	582								
Crabs:										
Hard					75, 000	$1, 750				
Stone					217, 660	21, 960				
Sea crawfish or spiny lobster					3, 500	245			203, 132	$19, 931
Shrimp	8, 603, 564	878, 592								
Total	19, 136, 419	895, 030	99, 715	5, 983	296, 160	23, 955	19, 468	973	203, 132	19, 931

Species	Spears		Dredges, clam		Tongs		Forks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	32, 136	$2, 963						
Clams: Hard			635, 856	$39, 741			91, 280	$7, 116
Oysters:								
Market, public					2, 599, 296	$199, 778	5, 040	945
Market, private					59, 780	3, 840		
Total	32, 136	2, 963	635, 856	39, 741	2, 659, 076	203, 618	96, 320	8, 061

Fisheries of Florida, 1929—Continued

CATCH: BY GEAR—Continued

Species	Hooks				Diving outfits		By hand	
	Sea crawfish		Sponge					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sea crawfish or spiny lobster	6,160	$594						
Shrimp	58,930	4,779						
Clams: Hard							18,904	$4,492
Conchs	6,200	434						
Oysters:								
Market, public							215,502	12,298
Market, private							182,000	6,800
Scallops, bay							24,094	7,687
Sponges:								
Grass			79,088	$20,551	6,075	$1,683		
Sheepswool			87,284	191,695	234,600	616,927		
Wire					11,060	4,424		
Yellow			47,601	14,959	63,013	29,407		
Total	71,290	5,807	213,973	227,205	314,748	652,441	440,500	31,277

OPERATING UNITS: BY COUNTIES

Items	Bay	Brevard	Broward	Charlotte	Citrus	Clay	Collier	Dade
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	141							20
On boats and shore—								
Regular	256	206	12	381	161	38	97	349
Casual	23	45	50	64	15		26	82
Total	420	251	62	445	176	38	123	451
Vessels:								
Motor—								
5 to 10 tons	5							
11 to 20 tons	4							1
21 to 30 tons	2							
31 to 40 tons	1							
41 to 50 tons	2							1
61 to 70 tons	4							
Total	18							2
Net tonnage	534							54
Boats:								
Motor	60	105	28	206	71	10	47	223
Other	85	171	15	390	154	25	76	75
Accessory boats								4
Apparatus:								
Purse seines—								
Other than menhaden								2
Length, yards								600
Haul seines—								
Common	28			24			4	
Length, yards	11,700			9,200			1,450	
Long						10		
Length, yards						9,400		
Gill nets—Runaround	19	195	5	407	116		53	87
Square yards	13,550	186,670	15,000	398,932	62,991		65,190	208,800
Trammel nets	6			26			7	
Square yards	3,252			23,400			14,000	
Lines—								
Hand	172	33	40	85	30		28	172
Hooks	334	66	40	85	30		28	172
Troll	2	65	31	333				218
Hooks	2	65	37	333				436
Trot with hooks		4				38		
Hooks		960				17,000		
Fyke nets								110
Dip nets								40
Cast nets			10					
Otter trawls, shrimp	1	12						
Yards at mouth	8	252						
Pots—								
Crab		70						2,170
Sea crawfish			330					2,170
Spears	19							
Dredges—								
Clam							1	
Tongs	74			4	32			
Forks							15	
Hooks—								
Sea crawfish								52

Fisheries of Florida, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Dixie	Duval	Escambia	Franklin	Glades	Gulf	Hernando	Hillsborough
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	315	49	--------	60	--------	18
On boats and shore—								
Regular	24	295	384	504	123	88	4	134
Casual	12	6	10	2	--------	7	--------	6
Total	36	301	709	555	123	155	4	158
Vessels:								
Motor—								
5 to 10 tons	--------	--------	--------	6	--------	--------	--------	--------
11 to 20 tons	--------	--------	4	1	--------	--------	--------	3
21 to 30 tons	--------	--------	1	--------	--------	--------	--------	--------
31 to 40 tons	--------	--------	--------	--------	--------	1	--------	--------
41 to 50 tons	--------	--------	6	--------	--------	--------	--------	--------
51 to 60 tons	--------	--------	6	--------	--------	--------	--------	--------
61 to 70 tons	--------	--------	8	--------	--------	1	--------	--------
71 to 80 tons	--------	--------	3	--------	--------	--------	--------	--------
91 to 100 tons	--------	--------	1	--------	--------	--------	--------	--------
101 to 110 tons	--------	--------	1	--------	--------	--------	--------	--------
Total	--------	--------	30	7	--------	2	--------	3
Net tonnage	--------	--------	1,632	51	--------	96	--------	40
Sail—								
51 to 60 tons	--------	--------	1	--------	--------	--------	--------	--------
61 to 70 tons	--------	--------	3	--------	--------	--------	--------	--------
131 to 140 tons	--------	--------	1	--------	--------	--------	--------	--------
141 to 150 tons	--------	--------	1	--------	--------	--------	--------	--------
Total	--------	--------	6	--------	--------	--------	--------	--------
Net tonnage	--------	--------	527	--------	--------	--------	--------	--------
Total vessels	--------	--------	36	7	--------	2	--------	3
Total net tonnage	--------	--------	2,159	51	--------	96	--------	40
Boats:								
Motor	6	127	126	182	41	16	1	49
Other	36	154	72	99	57	6	4	100
Apparatus:								
Purse seines—								
Menhaden	--------	--------	--------	1	--------	10	--------	--------
Length, yards	--------	--------	--------	280	--------	2,960	--------	--------
Haul seines—								
Common	--------	--------	4	14	--------	5	--------	5
Length, yards	--------	--------	1,520	4,700	--------	2,000	--------	1,750
Long	--------	--------	--------	--------	19	--------	--------	--------
Length, yards	--------	--------	--------	--------	18,000	--------	--------	--------
Gill nets—								
Drift	--------	167	--------	12	--------	--------	--------	--------
Square yards	--------	280,000	--------	14,000	--------	--------	--------	--------
Runaround	19	--------	12	28	--------	6	4	172
Square yards	7,125	--------	72,000	17,445	--------	8,160	2,400	88,996
Trammel nets	--------	--------	30	--------	--------	--------	--------	--------
Square yards	--------	--------	15,600	--------	--------	--------	--------	--------
Lines—								
Hand	36	14	395	70	--------	7	--------	48
Hooks	36	28	1,005	140	--------	7	--------	82
Troll	--------	21	--------	--------	--------	--------	--------	--------
Hooks	--------	21	--------	--------	--------	--------	--------	--------
Trot with baits or snoods	--------	5	--------	--------	--------	--------	--------	--------
Baits or snoods	--------	750	--------	--------	--------	--------	--------	--------
Trot with hooks	--------	45	--------	48	1	--------	--------	--------
Hooks	--------	13,500	--------	9,600	500	--------	--------	--------
Fyke nets	--------	--------	--------	--------	1,700	--------	--------	--------
Dip nets	--------	--------	5	--------	--------	--------	--------	--------
Otter trawls, shrimp	--------	28	6	62	--------	--------	--------	--------
Yards at mouth	--------	588	72	744	--------	--------	--------	--------
Wire baskets	--------	--------	--------	550	--------	--------	--------	--------
Spears	--------	--------	--------	4	--------	--------	--------	--------
Tongs	--------	--------	34	205	--------	--------	--------	--------

Fisheries of Florida, 1929—Continued

OPERATING UNITS: By counties—Continued

Items	Indian River	Jefferson	Lee	Levy	Manatee	Martin	Monroe	Nassau
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				7			37	137
On boats and shore—								
Regular	64	10	94	173	136	110	560	224
Casual		6	47	25	4	31	22	20
Total	64	16	141	205	140	141	619	381
Vessels:								
Motor—								
5 to 10 tons				1			3	7
11 to 20 tons							2	3
31 to 40 tons								1
41 to 50 tons								1
51 to 60 tons							1	1
81 to 90 tons								1
151 to 160 tons								1
Total				1			6	15
Net tonnage				10			102	481
Boats:								
Motor	38	3	64	79	60	73	223	94
Other	38	16	119	150	102	43	310	41
Accessory boats							15	12
Apparatus:								
Purse seines—								
Menhaden								6
Length, yards								1, 956
Haul seines—								
Common			6		8	6		
Length, yards			2, 100		1, 975	3, 600		
Gill nets—								
Anchor							8	
Square yards							2, 400	
Runaround	58	10	83	96	121	65	113	3
Square yards	60, 900	6, 000	59, 966	38, 920	179, 250	84, 000	186, 950	6, 500
Stake								60
Square yards								3, 900
Trammel nets			5	16	11			
Square yards			5, 880	4, 940	6, 760			
Lines—								
Hand	17	16	48	55	25	5	129	6
Hooks	34	16	48	55	28	5	194	6
Troll	22		47	15	56	133	168	
Hooks	22		47	24	56	231	336	
Pound nets				12				
Stop nets					1			
Square yards					2, 000			
Dip nets							80	
Otter trawls, shrimp								93
Yards at mouth								1, 953
Pots—								
Crabs							180	
Sea crawfish							294	
Tongs				26				
Hooks—								
Sea crawfish							80	
Sponge							219	

Fisheries of Florida, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Okaloosa	Okeechobee	Palm Beach	Pasco	Pinellas	Putnam	St. John	St. Lucie
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					85		40	
On boats and shore—								
Regular	138	49	246	33	880	247	255	241
Casual	6		56		136			14
Total	144	49	302	33	1,101	247	295	255
Vessels:								
Motor—								
5 to 10 tons					3		4	
11 to 20 tons					4		6	
21 to 30 tons					2		1	
31 to 40 tons					2			
Total					11		11	
Net tonnage					200		145	
Sail—								
5 to 10 tons					1			
11 to 20 tons					1			
Total					2			
Net tonnage					25			
Total vessels					13		11	
Total net tonnage					225		145	
Boats:								
Motor	26	19	134	15	216	80	102	123
Other	14	41	43	33	332	174	20	68
Accessory boats					9		2	
Apparatus:								
Purse seines—								
Menhaden							1	
Length, yards							327	
Haul seines—								
Common	16				12			5
Length, yards	5,600				5,375			5,000
Long		11				44		
Length, yards		9,100				31,700		
Gill nets—								
Drift						37		
Square yards						110,000		
Runaround			90	33	227			127
Square yards			214,200	19,800	427,560			290,900
Trammel nets	14				2			
Square yards	6,160				1,650			
Lines—								
Hand	58		55		192			14
Hooks	116		55		308			14
Troll			228		94			122
Hooks			456		188			244
Trot with hooks		2				38		
Hooks		600				11,640		
Pound nets						35		
Fyke nets		1,030				140		
Cast nets			24					
Otter trawls, shrimp							113	32
Yards at mouth							2,353	672
Pots—								
Crab					1,319			
Eel						100		
Spears	7							
Tongs			3					6
Forks							20	
Hooks—								
Sponge					59			
Diving outfits					51			

Fisheries of Florida, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Santa Rosa	Sarasota	Seminole	Taylor	Volusia	Wakulla	Walton
Fishermen:							
On boats and shore—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	34	205	98	70	156	159	10
Casual	6	30		48	38	9	
Total	40	235	98	118	194	168	10
Boats:							
Motor	10	100		17	52	26	3
Other	10	193	98	118	90	141	5
Apparatus:							
Haul seines—							
Common		25				7	
Length, yards		8, 700				2, 250	
Long					3		
Length, yards					1, 500		
Gill nets—Runaround		216		64	25	120	
Square yards		388, 410		24, 000	23, 750	72, 000	
Trammel nets	10	10					5
Square yards	4, 500	30, 000					1, 500
Lines—							
Hand		42		90	41		
Hooks		42		90	60		
Troll		201					
Hooks		201					
Trot with baits or snoods					4		
Baits or snoods					1, 600		
Trot with hooks			98				
Hooks			58, 800				
Otter trawls, shrimp					39		
Yards at mouth					819		
Pots—							
Crab		75					
Spears	16					11	
Tongs	8				34	14	
Forks					26		

CATCH: BY COUNTIES

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack	200	$6			2, 000	$120		
Barracuda							2, 150	$65
Bluefish	102, 772	5, 164	68, 100	$6, 810	13, 700	1, 370	28, 414	2, 841
Bluerunner or hardtail	4, 860	93	2, 300	46	6, 600	198	7, 350	147
Bonito	950	28					1, 150	34
Cabio or crab eater							6, 150	185
Catfish and bullheads			32, 000	1, 600				
Cigarfish	57, 000	1, 710						
Crevalle			27, 600	706	7, 000	270	12, 572	401
Croaker			8, 340	250			7, 350	220
Dolphin					5, 000	500		
Drum:								
Black			29, 740	673			706	28
Red or redfish	20, 249	796	109, 243	4, 370			155, 651	6, 246
Flounders	14, 855	1, 329	2, 700	108			31, 151	1, 879
Groupers	950, 904	28, 524			31, 500	1, 890	6, 711	201
Grunts							7, 450	224
Jewfish	8, 800	264					4, 506	135
Kingfish or "king mackerel"	763	45	6, 410	370	117, 000	6, 830	47, 229	2, 833
King whiting or "kingfish"			65, 880	2, 400			11, 150	335
Menhaden	7, 000	140						
Mojarro			50, 900	1, 679			78, 344	2, 519
Moonfish	110	3						
Mullet	1, 217, 524	48, 701	2, 137, 435	64, 123	36, 500	1, 095	3, 334, 218	133, 369
Muttonfish					42, 000	4, 200	12, 150	365
Permit							8, 550	261
Pigfish			55, 169	1, 104			6, 550	201
Pinfish or sailors choice			105, 620	2, 113				
Pompano	8, 845	1, 303	22, 430	5, 608	2, 000	500	64, 518	12, 903
Porgies	42, 000	1, 260			4, 500	225		
Sheepshead	11, 036	431	46, 802	1, 583			156, 803	6, 283
Snapper:								
Mangrove			7, 060	290	1, 500	90	43, 904	1, 756
Red	1, 432, 139	114, 572						

Fisheries of Florida, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Snook or sergeantfish			41,940	1,678	1,500	75	87,277	3,491
Spadefish							61,502	1,845
Spanish mackerel	330,728	16,676	50,600	3,777	20,800	1,664	279,377	16,763
Spot	1,060	30	78,982	2,134			9,130	304
Squeteagues or "sea trout"	74,417	5,924	497,334	38,440			615,733	53,604
Tenpounder	176,000	3,520						
Tripletail							2,150	86
Yellowtail					1,800	180	4,550	161
Crabs: Hard			75,000	1,750				
Sea crawfish or spiny lobster					37,000	3,700		
Shrimp	2,000	240	458,330	21,770				
Oysters: Market, public	95,060	13,160					14,700	2,100
Total	4,559,272	243,919	3,979,915	163,382	330,400	22,907	5,109,146	251,785

Species	Citrus		Clay		Collier		Dade	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack							4,550	$91
Barracuda							12,010	360
Black bass			11,910	$1,045				
Bluefish	400	$24			921	$92	57,379	4,893
Bluerunner or hardtail					8,400	168	21,644	497
Catfish and bullheads			457,052	18,280				
Cero							5,000	250
Crappie			3,485	222				
Crevalle					12,200	366	15,400	462
Croaker					800	24		
Drum:								
Black					1,200	48	8,500	255
Red or redfish	60,650	2,260			86,400	3,456	6,400	256
Flounders	100	8			800	48		
Groupers	3,894	105			8,400	252	69,190	2,768
Grunts	550	15			2,000	60	39,400	1,576
Hogfish							2,400	72
Jewfish					1,000	30	12,000	720
Kingfish or "king mackerel"					500	30	190,489	45,524
King whiting or "kingfish"					2,400	72	1,800	72
Mojarro					4,400	132	5,000	150
Mullet	1,077,202	43,088			793,509	49,740	1,253,589	37,131
Muttonfish							117,157	9,373
Permit					4,200	126	1,500	45
Pigfish	200	6			3,200	96	1,800	54
Pinfish or sailors choice							500	15
Pompano	1,390	278			22,302	4,460	6,000	1,500
Porgies							18,800	564
Sheepshead	57,900	2,140			112,400	4,496	1,500	60
Snapper:								
Mangrove	41,410	1,524					20,000	1,600
Red							15,000	1,200
Snook or sergeantfish					70,250	2,810	5,250	203
Spanish mackerel	700	42			124,811	7,489	1,128,819	67,936
Spot					4,000	120	800	24
Squeteagues or "sea trout"	174,048	15,792			63,850	5,908	24,967	1,997
Sunfish			6,618	199				
Tripletail					2,000	80		
Yellowtail					3,000	90	48,600	3,888
Crabs: Stone							93,000	9,300
Sea crawfish or spiny lobster							183,766	18,376
Clams: Hard					715,856	44,741		
Oysters: Market, public	205,149	9,769						
Total	1,623,593	75,051	479,065	19,746	2,048,799	124,934	4,092,210	211,212

Fisheries of Florida, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Dixie		Duval		Escambia		Franklin	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack							1, 320	$36
Bluefish	2, 800	$168	2, 469	$198	44, 484	$1, 213	13, 857	793
Bluerunner or hardtail					40, 751	741	6, 000	120
Bonito					915	17		
Cabio or crab eater					44	1		
Catfish and bullheads			86, 000	4, 300			178, 509	10, 257
Crevalle			680	20	132	4		
Croaker			5, 492	205	143	5		
Drum:								
Black			658	23	1, 100	20	440	20
Red or redfish	20, 400	616	7, 396	350	4, 617	210	16, 562	654
Flounders	2, 000	120	1, 740	87	662	60	5, 008	450
Groupers			120	6	1, 421, 323	42, 757	568, 817	17, 065
Jewfish					15, 360	513	2, 000	60
Kingfish or "king mackerel"					1, 834	67	143	9
King whiting or "kingfish"			92, 700	3, 105	423	14	2, 930	77
Menhaden							1, 594, 780	8, 699
Mullet	189, 400	7, 776	175, 692	8, 785	426, 543	17, 062	1, 109, 830	44, 193
Pigfish	1, 500	45			1, 070	39		
Pompano	3, 000	600	100	25	3, 022	550	3, 115	467
Porgies					47, 246	1, 283	9, 500	285
Sea bass			47, 052	4, 705			14, 052	634
Shad			312, 439	46, 866				
Sheepshead	18, 000	640	2, 558	174	10, 065	457	6, 545	238
Snapper:								
Mangrove	800	32	19, 117	1, 912				
Red					4, 620, 508	371, 187	571, 687	45, 735
Spadefish							563	22
Spanish mackerel	650	39	16, 673	1, 834	149, 313	5, 433	43, 118	2, 579
Spot	3, 300	132	670	20	594	22	1, 088	31
Squeteagues or "sea trout"	51, 215	4, 847	27, 555	2, 409	10, 146	646	86, 563	7, 566
Sturgeon							6, 161	860
Tenpounder							20, 070	600
Crabs, hard			20, 000	800	1, 824	114		
Shrimp			1, 653, 311	77, 809	35, 130	3, 513	1, 315, 918	55, 089
Oysters, market, public					82, 131	15, 644	1, 999, 074	142, 790
Turtles					363	4		
Total	293, 065	15, 015	2, 472, 422	153, 633	6, 919, 743	461, 576	7, 577, 650	339, 329

Species	Glades		Gulf		Hernando		Hillsborough	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass	262, 784	$26, 279						
Bluefish			28, 600	$1, 560	1, 000	$60	7, 427	$891
Bluerunner or hardtail			150, 000	1, 500			6, 750	139
Catfish and bullheads	2, 081, 614	93, 673						
Crappie	552, 302	22, 092						
Croaker			880	8				
Drum, red or redfish			4, 950	180	1, 000	40	50, 866	2, 035
Flounders			2, 750	125			837	42
Groupers							220, 788	6, 624
Jewfish							800	24
Kingfish or "king mackerel"			550	30				
Menhaden			17,195,400	158, 208				
Mullet			180, 000	7, 200	75, 000	3, 000	1, 320, 397	52, 815
Pigfish					200	8	500	20
Pompano			17, 600	2, 400	500	100	3, 300	660
Porgies							1, 200	36
Sheepshead			2, 200	80	1, 500	60	29, 040	1, 217
Snapper:								
Mangrove					200	10	4, 160	157
Red							263, 158	21, 053
Snook or sergeantfish							1, 870	93
Spadefish			220	6			4, 512	104
Spanish mackerel			101, 000	6, 060			6, 608	529
Spot			220	6			5, 200	172
Squeteagues or "sea trout"			18, 500	1, 360	6, 000	600	181, 509	16, 175
Sunfish	182, 101	5, 453						
Tenpounder			10, 000	200			1, 800	54
Turtles	3, 075	92						
Total	3, 081, 876	147, 589	17,712,870	178, 923	85, 400	3, 878	2, 110, 722	102, 840

Fisheries of Florida, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Indian River		Jefferson		Lee		Levy	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore							587	$70
Bluefish	10,557	$1,166			1,368	$137	87,679	4,806
Bluerunner or hardtail	2,500	75			4,000	80	367,766	6,687
Bonito							4,620	168
Cabio or crab eater							2,310	63
Crevalle	17,600	528					704	19
Croaker	5,400	162			3,500	105		
Drum:								
Black	6,068	182					2,134	78
Red or redfish	15,648	569	16,280	$592	53,330	2,133	57,336	2,085
Flounders	3,500	140			3,200	192	2,992	183
Groupers	4,240	127					11,497	338
Jewfish							3,087	112
Kingfish or "king mackerel"	5,850	351			21.218	1,273	44,713	2,439
King whiting or "kingfish"	21,035	841			5,000	150		
Mojarro	35,416	1,417			7,000	210		
Mullet	482,403	11,016	142,000	5,680	884,709	35,588	1,244,431	49,777
Permit					800	24		
Pigfish	17,888	390			800	24		
Pinfish or sailors choice	5.000	100						
Pompano	22,357	5,015	1,375	250	16,459	3,292	6,581	1,470
Porgies							1,450	29
Sea bass	343	17					5,406	295
Sheepshead	15,000	600	12,680	472	55,902	2,236	22,167	806
Snapper:								
Mangrove	13,300	778	2,200	80			7,722	286
Red	3,581	286						
Snook or sergeantfish	30,540	1,222			29,750	1,190		
Spadefish	600	18						
Spanish mackerel	10,698	856			111,018	6,661	115,298	6,333
Spot	93,008	2,790	1,320	48	10,400	312	1,980	67
Squeteagues or "sea trout"	153,514	15,352	36,740	3,006	108,522	9,122	440,570	40,766
Sturgeon							7,007	1,274
Yellowtail					13,400	402		
Oysters, market, public					4,200	300	42,420	3,475
Total	976,046	43,998	212,595	10,128	1,334,576	63,431	2,480,457	121,626

Species	Manatee		Martin		Monroe		Nassau	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack	5,000	$150			8,300	$249		
Barracuda					3,200	96		
Bluefish	16,400	1,968	99,689	$13,871	14,868	1,767	6,000	$600
Bluerunner or hardtail	3,609	72	17,860	682	23,000	460		
Cabio or crab eater	1,400	54						
Catfish and bullheads			30,400	1,216				
Cero					9,800	392		
Crevalle	2,480	49	33,630	1,157	3,000	90		
Croaker	3,400	102	4,020	121			6,000	180
Drum:								
Black	1,000	50	7,200	204	1,700	61	1,000	30
Red or redfish	185,592	7,416	22,850	1,108	24,184	967	9,800	498
Flounders	3,400	204	200	8	1,000	60	4,000	200
Groupers	5,100	153	1,800	72	150,400	5,986		
Grunts	1,600	48			13,300	507		
Hogfish					1,200	36		
Jewfish	600	18	1,500	30	34,950	2,695		
Kingfish or "king mackerel"	28,837	1,730	63,585	3,220	1,639,750	82,002		
King whiting or "kingfish"			10,750	553	2,900	129	194,800	5,848
Menhaden							31,279,400	147,972
Mojarro	300	6	72,235	3,739				
Mullet	1,714,101	68,564	528,117	15,844	593,909	22,056		
Muttonfish			2,500	250	32,600	2,608		
Permit	900	36						
Pigfish	1,600	64	4,200	144				
Pinfish or sailors choice					1,200	36		
Pompano	33,428	6,686	39,104	9,731	2,000	400		
Porgies	1,800	54			5,000	150		
Rockfish					500	15		
Shad							21,000	3,780
Sharks					176,000	2,200		
Sheepshead	42,100	1,684	11,630	577	27,802	1,112	3,200	192
Snapper:								
Mangrove	2,800	112	7,500	416	23,200	928	6,000	600
Red					109,300	9,344		
Snook or sergeantfish	84,440	3,377	128,309	5,602	1,000	40		
Spadefish	3,400	102	1,600	48	400	12		
Spanish mackerel	209,756	12,305	242,281	17,064	1,117,068	67,024		

Fisheries of Florida, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Manatee		Martin		Monroe		Nassau	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Spot	5, 600	224	15, 800	632	500	15	2, 000	60
Squeteagues or "sea trout"	129, 700	11, 777	21, 762	1, 928	38, 422	3, 324	10, 400	712
Sturgeon	15	3						
Tripletail					6, 000	240		
Turbot					200	6		
Yellowtail					98, 400	7, 948		
Crabs, stone					20, 000	1, 650		
Sea crawfish or spiny lobster					192, 500	14, 605		
Shrimp							5, 413, 921	258, 115
Clams, hard							2, 720	850
Conchs					6, 200	434		
Oysters:								
Market, public							153, 272	5, 628
Market, private							182, 000	6, 800
Turtles					12, 000	960		
Sponges:								
Grass					24, 438	5, 405		
Sheepswool					45, 884	68, 826		
Yellow					36, 457	9, 770		
Total	2,488,158	117, 008	1,368,522	78, 217	4,502,532	314, 605	37,295,513	432, 065

Species	Okaloosa		Okeechobee		Palm Beach		Pasco	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack	385	$10			1, 460	$34		
Black bass			48, 438	$3, 875				
Bluefish	30, 868	842			244, 227	29, 304	2, 500	$200
Bluerunner or hardtail	83, 374	1, 516			15, 300	356		
Bonito	900	18						
Catfish and bullheads			473, 603	21. 312				
Cigarfish	32, 100	963						
Crappie			185, 515	5, 565				
Crevalle	4, 180	114			17, 900	545		
Croaker					2, 400	72		
Drum:								
Black	770	14			200	6		
Red or redfish	3, 526	160			2, 600	130	20, 000	800
Flounders	5, 073	461						
Groupers	218, 040	6, 541			15, 000	600		
Grunts					1, 200	48		
Jewfish	1, 400	42						
Kingfish or "king mackerel"	3, 118	113			733, 753	36, 688		
King whiting or "kingfish"	2, 706	98			3, 200	128		
Menhaden	17, 400	522						
Mojarro					29, 800	1, 636		
Mullet	310, 920	12, 437			40, 400	1, 436	660, 300	26, 412
Muttonfish					19, 225	1, 714		
Pigfish					2, 400	72		
Pinfish or sailors choice					800	24		
Pompano	15, 251	2, 773			39, 738	9, 935	950	190
Porgies	21, 987	660						
Sheepshead	9, 252	421			2, 000	80	2, 600	104
Snapper:								
Mangrove					2, 700	135	12, 000	480
Red	200, 740	16, 059						
Snook or sergeantfish					18, 200	772		
Spadefish	1, 565	57						
Spanish mackerel	166, 498	6, 054			609, 922	42, 705	3, 000	210
Spot	1, 815	66						
Squeteagues or "sea trout"	22, 564	2, 041			3, 055	265	16, 300	1, 630
Sunfish			38, 877	1, 166				
Tenpounder	48, 775	1, 463						
Yellowtail					500	30		
Oysters, market, public					875	125		
Total	1, 203, 207	53, 445	746, 433	31, 918	1, 806, 855	126, 840	717, 650	30, 026

Species	Pinellas		Putnam		St. John		St. Lucie	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			408, 229	$4, 101				
Amberjack	20, 887	$835						
Black bass			98, 364	10, 541				
Bluefish	95, 164	10, 273					86, 059	$10, 327
Bluerunner or hardtail	720	13					11, 995	255
Catfish and bullheads			1,462,165	64, 132			738	30

Fisheries of Florida, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Pinellas		Putnam		St. John		St. Lucie	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crappie			255, 488	$11, 236				
Crevalle	3, 448	$94					67, 397	$2, 022
Croaker	1, 100	40			3, 750	$82	6, 200	186
Drum:								
Black	1, 980	72			625	19	12, 555	377
Red or redfish	67, 518	2, 580	753	30	1, 875	56	10, 709	424
Eels			19, 618	981				
Flounders	11, 426	573			2, 000	125	1, 600	75
Groupers	427, 353	12, 731					10, 921	218
Grunts	3, 673	100						
Hickory shad			41, 251	1, 238				
Jewfish	1, 500	45						
Kingfish or "king mackerel"	78, 945	4, 883					540, 557	32, 433
King whiting or "kingfish"	550	20			132, 850	3, 991	44, 469	1, 509
Menhaden					438, 000	1, 971		
Mojarro							266, 583	10, 663
Mullet	3,186,025	127, 441	2, 698	94			550, 644	16, 520
Pigfish	3, 250	104					9, 800	294
Pinfish or sailors choice	3, 300	120					7, 550	227
Pompano	23, 215	4, 643					47, 342	11, 836
Porgies	3, 800	114						
Shad			367, 787	50, 657				
Sheepshead	51, 685	1, 880					20, 502	821
Snapper:								
Mangrove	10, 846	394					15, 401	982
Red	502, 611	40, 210						
Snook or sergeantfish	10, 084	341					54, 386	2, 719
Spadefish	198	7						
Spanish mackerel	526, 452	36, 692					418, 285	29, 280
Spot	2, 310	79			1, 250	37	20, 800	624
Squeteagues or "sea trout"	370, 653	29, 493			2, 500	135	80, 086	7, 978
Sunfish			256, 371	7, 691				
Tenpounder	22, 000	800						
Crabs, stone	112, 160	11, 450						
Shrimp					6,930,829	329, 270	1,265,167	60, 048
Clams, hard	3, 704	834						
Oysters, market, public					41, 440	3, 545	13, 300	1, 900
Scallops, bay	13, 104	4, 057						
Turtles			11, 956	240			94	3
Sponges:								
Grass	60, 725	16, 829						
Sheepswool	276, 000	739, 796						
Wire	11, 060	4, 424						
Yellow	74, 157	34, 596						
Total	5,981,603	1,086,563	2,924,680	150, 941	7,555,119	339, 231	3,563,140	191, 751

Species	Santa Rosa		Sarasota		Seminole		Taylor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			22, 000	$2, 580			5, 700	$342
Bluerunner or hardtail			15, 700	314				
Catfish and bullheads					390, 000	$19, 500		
Crevalle			9, 412	282				
Croaker			4, 300	129				
Drum:								
Black	440	$20	1, 718	69				
Red or redfish	2, 640	192	66, 640	2, 666			35, 800	1, 416
Flounders	11, 352	1, 032	3, 464	208			2, 400	144
Groupers			17, 192	516				
Grunts			2, 000	60				
Kingfish or "king mackerel"			90, 654	5, 439				
Mullet	197, 400	7, 896	1, 320, 087	52, 801			354, 040	14, 062
Permit			1, 846	74				
Pigfish			4, 201	168				
Pinfish or sailors choice			400	12				
Pompano			66, 824	13, 365			3, 070	614
Porgies			1, 200	36				
Sheepshead	2, 090	95	183, 590	7, 344			20, 500	800
Snapper, mangrove			3, 536	141			5, 500	220
Snook or sergeantfish			14, 200	568				
Spadefish			4, 702	188				
Spanish mackerel			181, 118	10, 867			400	20
Spot			713	29			2, 500	100
Squeteagues or "sea trout"	5, 940	486	175, 771	15, 336			105, 280	9, 665
Crabs, stone			1, 500	410				
Clams, hard			12, 480	2, 808				
Oysters, market, public	13, 440	1, 920	21, 630	3, 770				
Scallops, bay			10, 990	3, 630				
Total	233, 302	11, 641	2, 237, 868	123, 810	390, 000	19, 500	535, 190	27, 383

Fisheries of Florida, 1929—Continued

CATCH: By counties—Continued

Species	Volusia		Wakulla		Walton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass	3, 000	$300				
Bluefish	21, 200	2, 120	5, 600	$336		
Bluerunner or hardtail			2, 000	60		
Catfish and bullheads	64, 000	2, 560				
Crappie	6, 740	472				
Crevalle	8, 790	264				
Croaker	4, 410	132	4, 200	126		
Drum:						
Black	3, 700	129			55	$2
Red or redfish	29, 560	1, 383	36, 390	1, 456	1, 540	112
Flounders	2, 100	101	3, 400	340	330	30
Groupers	2, 100	84				
King whiting or "kingfish"	67, 200	2, 628			2, 200	80
Mullet	363, 400	10, 902	1, 938, 500	75, 540	84, 200	3, 360
Pigfish	7, 600	152				
Pinfish or sailors choice	14, 700	443				
Pompano	1, 080	310	5, 162	1, 032		
Sea bass	22, 000	1, 540				
Sheepshead	5, 440	264	14, 240	570	1, 540	112
Snapper, mangrove	12, 400	1, 216				
Snook or sergeantfish	1, 200	48				
Spanish mackerel	100	12				
Spot	4, 200	132	7, 000	280		
Squeteagues or "sea trout"	168, 050	11, 041	195, 952	19, 595	13, 640	1, 116
Sunfish	20, 000	600				
Crabs, hard	26, 400	924				
Shrimp	1, 543, 958	73, 338				
Clams, hard	11, 280	2, 116				
Oysters:						
Market, public	93, 520	6, 244	39, 627	2, 651		
Market, private	59, 780	3, 840				
Total	2, 567, 908	123, 295	2, 252, 071	101, 986	103, 505	4, 820

CATCH: By districts

Species	East coast		West coast		Lake Okeechobee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore			587	$70		
Alewives	408, 229	$4, 101				
Amberjack	8, 010	245	36, 092	1, 286		
Barracuda	12, 010	360	5, 350	161		
Black bass	113, 274	11, 886			311, 222	$30, 154
Bluefish	609, 380	70, 659	512, 822	36, 057		
Bluerunner or hardtail	78, 199	2, 109	724, 280	12, 110		
Bonito			8, 535	265		
Cabio or crab eater			9, 904	303		
Catfish and bullheads	2, 522, 355	111, 618	178, 509	10, 257	2, 555, 217	114, 985
Cero	5, 000	250	9, 800	392		
Cigarfish			89, 100	2, 673		
Crappie	265, 713	11, 930			737, 817	27, 657
Crevalle	195, 997	5, 974	48, 128	1, 419		
Croaker	46, 012	1, 390	25, 673	759		
Dolphin	5, 000	500				
Drum:						
Black	70, 246	1, 898	13, 243	482		
Red or redfish	216, 834	9, 174	991, 921	39, 068		
Eels	19, 618	981				
Flounders	17, 840	844	106, 200	7, 488		
Groupers	134, 871	5, 765	4, 010, 419	121, 793		
Grunts	40, 600	1, 624	30, 573	1, 014		
Hickory shad	41, 251	1, 238				
Hogfish	2, 400	72	1, 200	36		
Jewfish	13, 500	750	74, 003	3, 938		
Kingfish or "king mackerel"	2, 377, 644	125, 416	1, 958, 254	106, 893		
King whiting or "kingfish"	634, 684	21, 075	30, 259	975		
Menhaden	31, 717, 400	149, 943	18, 814, 580	167, 569		
Mojarro	459, 934	19, 284	90, 044	2, 867		
Moonfish			110	3		
Mullet	5, 570, 878	166, 946	22, 354, 245	908, 566		
Muttonfish	180, 882	15, 537	44, 750	2, 973		
Permit	1, 500	45	16, 296	521		
Pigfish	98, 857	2, 210	23, 071	775		
Pinfish or sailors choice	134, 170	2, 922	4, 900	168		
Pompano	180, 151	44, 460	301, 907	58, 436		

Fisheries of Florida, 1929—Continued

CATCH: BY DISTRICTS—Continued

	East coast		West coast		Lake Okeechobee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Porgies	23,300	$789	135,183	$3,907	----------	--------
Rockfish	----------	----------	500	15	----------	--------
Sea bass	69,395	6,262	19,458	929	----------	--------
Shad	701,226	101,303	----------	----------	----------	--------
Sharks	----------	----------	176,000	2,200	----------	--------
Sheepshead	108,632	4,351	851,637	33,678	----------	--------
Snapper:						
Mangrove	104,978	8,019	158,278	6,120	----------	--------
Red	18,581	1,486	7,700,143	618,160	----------	--------
Snook or sergeantfish	281,325	12,319	298,871	11,910	----------	--------
Spadefish	2,200	66	77,062	2,343	----------	--------
Spanish mackerel	2,498,178	165,128	3,466,913	201,776	----------	--------
Spot	217,510	6,453	58,730	2,037	----------	--------
Squeteagues or "sea trout"	989,223	80,257	2,942,035	259,779	----------	--------
Sturgeon	----------	----------	13,183	2,137	----------	--------
Sunfish	282,989	8,490	----------	----------	220,978	$6,619
Tenpounder	----------	----------	278,645	6,637	----------	--------
Tripletail	----------	----------	10,150	406	----------	--------
Turbot	----------	----------	200	6	----------	--------
Yellowtail	50,900	4,098	119,350	8,601	----------	--------
Crabs:						
Hard	121,400	3,474	1,824	114	----------	--------
Stone	93,000	9,300	133,660	13,510	----------	--------
Sea crawfish or spiny lobster	220,766	22,076	192,500	14,605	----------	--------
Shrimp	17,265,516	820,350	1,353,048	58,842	----------	--------
Clams, hard	14,000	2,966	732,040	48,383	----------	--------
Conchs	----------	----------	6,200	434	----------	--------
Oysters:						
Market, public	302,407	17,442	2,517,431	195,579	----------	--------
Market, private	241,780	10,640	----------	----------	----------	--------
Scallops, bay	----------	----------	24,094	7,687	----------	--------
Turtles	12,050	243	12,363	964	3,075	92
Sponges:						
Grass	----------	----------	85,163	22,234	----------	--------
Sheepswool	----------	----------	321,884	808,622	----------	--------
Wire	----------	----------	11,060	4,424	----------	--------
Yellow	----------	----------	110,614	44,366	----------	--------
Total	69,801,795	2,076,718	72,322,974	3,863,722	3,828,309	179,507

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 41 persons in Florida engaged primarily in transporting fishery products by means of vessels. In this trade 18 motor vessels, having a combined capacity of 296 net tons, were operated. The size of vessel in most popular use ranged from 11 to 20 net tons.

Wholesale.—There were 246 wholesale establishments in Florida engaged primarily in handling fresh and frozen products. These establishments employed 1,387 persons who received $747,243 in salaries and wages. The greatest concentration of these establishments was in Pinellas County, where 27 were operated.

Manufacturing.—There were 21 establishments in Florida in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 487 persons who received $327,694 in salaries and wages. The products manufactured, consisting principally of canned shrimp and menhaden products, were valued at $1,866,495. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095 "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms there were 127 fishermen employed who prepared fishery products. Their output, consisting principally of salted mullet, amounted to 369,147 pounds, valued at $27,387.

Industries related to the fisheries of Florida, 1929

TRANSPORTING

Items	Number
Persons engaged on transporting vessels	41
Transporting vessels:	
Motor—	
5 to 10 tons	4
11 to 20 tons	11
21 to 30 tons	1
31 to 40 tons	2
Total vessels	18
Total net tonnage	293

WHOLESALE

Items	Bay County	Brevard County	Charlotte County	Citrus and Pasco Counties	Clay County	Dade County	Duval County	Escambia and Okaloosa Counties	Franklin and Gulf Counties
Establishments	12	15	4	9	4	7	13	3	17
Persons engaged:									
Proprietors	14	16	6	12	4	11	14	4	22
Salaried employees	4	3	7	2	-------	3	16	12	8
Wage earners	32	34	25	23	6	16	56	45	153
Paid to salaried employees	$9, 600	$3, 540	$15, 880	$1, 980	-------	$13, 236	$49, 457	$41, 580	$14, 740
Paid to wage earners	16, 149	13, 046	20, 444	10, 806	$3, 400	19, 488	39, 263	39, 602	57, 401
Total salaries and wages	25, 749	16, 586	36, 324	12, 786	3, 400	32, 724	88, 730	81, 182	72, 141

Items	Glades and Okeechobee Counties	Hillsborough County	Indian River County	Lee and Collier counties	Levy, Taylor, and Wakulla Counties	Manatee County	Martin County	Monroe County	Nassau County
Establishments	5	7	5	4	12	7	8	10	13
Persons engaged:									
Proprietors	5	9	6	6	17	12	12	11	14
Salaried employees	3	1	2	1	3	1	5	8	-------
Wage earners	12	8	3	23	19	13	9	41	63
Paid to salaried employees	$3, 560	$4, 272	$1, 520	$15, 330	$3, 650	$6, 069	$8, 110	$17, 346	-------
Paid to wage earners	6, 900	5, 769	1, 800	12, 843	12, 260	6, 917	7, 014	36, 710	$13, 720
Total salaries and wages	10, 460	10, 041	3, 320	28, 173	15, 910	12, 986	15, 124	54, 056	13, 720

Items	Palm Beach County	Pinellas County	Putnam County	Sarasota County	Seminole County	St. Johns County	St. Lucie County	Volusia County	Total
Establishments	12	27	8	3	3	13	10	15	246
Persons engaged:									
Proprietors	16	36	8	4	3	8	7	12	289
Salaried employees	6	5	4	2	-------	2	3	-------	101
Wage earners	17	130	19	7	1	131	36	75	997
Paid to salaried employees	$12, 470	$29, 917	$4, 200	$3, 300	-------	$2, 600	$5, 200	-------	$267,567
Paid to wage earners	13, 603	65, 228	13, 752	5, 090	$450	27, 520	14, 140	$16, 361	479, 676
Total salaries and wages	26, 073	95, 145	17, 952	8, 390	450	30, 120	19, 340	16, 361	747, 243

Industries related to the fisheries of Florida, 1929—Continued

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	21	Salted:		
Persons engaged:		Mullet .... pounds	425,400	$28,632
Proprietors	21	Mullet roe .... do	35,055	9,461
Salaried employees	25	Other fish .... do	42,500	1,340
Wage earners	441	Canned:		
		Shrimp, dry, in tins .... standard cases [2]	3,504	19,666
Paid to salaried employees	$75,920	Shrimp, wet, in tins .... do	37,997	219,805
Paid to wage earners	251,774	Shrimp, wet, in glass .... do	22,389	245,349
		Oysters .... do	9,822	48,912
Total salaries and wages	327,694	Menhaden products:		
		Dry scrap .... tons	5,513	271,705
		Acid scrap .... do	6,926	176,662
		Fish meal .... do	5,905	312,355
		Oil .... gallons	487,662	210,868
		Miscellaneous products [3]		321,740
		Total		1,866,495

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged .... number	127	
Salted products:		
Eels .... pounds	5,000	$250
Mullet .... do	335,290	19,860
Mullet roe .... do	28,857	7,277
Total	369,147	27,387

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[1] Includes the production of 19 firms whose activities were principally in the wholesale trade.

[2] A standard case contains forty-eight 5-ounce cans of oysters, forty-eight 5-ounce cans in the dry pack, or forty-eight 5¾-ounce cans in the wet pack of shrimp.

[3] Includes canned clam and turtle products, shark products, oyster-shell products, shrimp meal, miscellaneous scrap and oil, and shell lamps.

SPONGE FISHERY

In the waters along the Gulf coast of Florida there is located the only commercial sponge fishery in the United States. During 1929 this fishery employed 855 fishermen, which is 5 per cent more than the number employed during 1928. Their catch amounted to 528,721 pounds, valued at $879,646. This represents a decrease of 5 per cent in the catch, but an increase of 3 per cent in the value of the catch as compared with the catch and its value for the previous year. The greater part of the catch consisted of sheepswool sponges, although there were considerable quantities of yellow and grass sponges and a small production of wire sponges.

Operating units.—In making the catch, the fishermen employed 5 motor vessels, 2 sailing vessels, 412 motor and other small fishing boats, 278 sponge hooks, and 51 diving outfits. The vessels had a combined capacity of 85 net tons.

Marketing the sponges.—The greater portion of the catch landed at Tarpon Springs is marketed through the Sponge Exchange located there. During 1929 sponges, amounting to 378,514 pounds, valued at $706,645, were handled on the exchange. This represents 72 per cent of the quantity of the entire Florida catch and 80 per cent of the value. Transactions are made on the exchange at auction, and bidders represent merchants in various sections of this and foreign countries.

Our imports of sponges in 1929, which originated mostly from Cuba, although considerable quantities come from the British West Indies, amounted to 856,515 pounds, valued at $1,091,129. Our exports during 1929 which were forwarded mainly to the United Kingdom, Canada, Argentina, France, Italy, Egypt, and the Netherlands, amounted to 124,443 pounds, valued at $151,933. The net consumption of sponges in 1929 in the United States, computed by adding the volume of imports for domestic consumption to the domestic production and deducting the exports, amounted to 1,260,793 pounds, valued at $1,818,842.

Sponges are utilized in the arts and industries, such as in applying a glaze to pottery, for the toilet, and for cleaning automobiles and other vehicles. Some also are used in surgical work.

During 1930 sponges handled on the exchange amounted to 414,082 pounds valued at $802,938. This is an increase of 9 per cent in quantity and 14 per cent in value as compared with the quantity and value of the transactions on the exchange during 1929. However, it represents a decrease of 8 per cent in quantity and an increase of 14 per cent in value as compared with the average quantity and value of the transactions over the 5-year period from 1922 to 1926. It is estimated that the value of sponges sold outside of the exchange during 1930 amounted to $75,000. Of the total sponges sold on the exchange in 1930, 258,110 pounds, valued at $689,670, were large wool; 41,434 pounds, valued at $60,908, were small wool; 57,039 pounds, valued at $33,083, were yellow; 54,208 pounds, valued at $17,346, were grass; and 3,291 pounds, valued at $1,931, were wire sponges.

Sponge fishery of Florida, 1929

OPERATING UNITS: BY GEAR

Items	Sponge hooks	Diving outfits	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels	41		41
On boat and shore, regular	418	396	814
Total	459	396	855
Vessels:			
Motor—			
5 to 10 tons	2		2
11 to 20 tons	2		2
21 to 30 tons	1		1
Total	5		5
Net tonnage	60		60
Vessels—Continued.			
Sail—	*Number*	*Number*	*Number*
5 to 10 tons	1		1
11 to 20 tons	1		1
Total	2		2
Net tonnage	25		25
Total vessels	7		7
Total net tonnage	85		85
Boats:			
Motor	106	52	158
Other	254		254
Apparatus	278	51	

CATCH: BY GEAR

Sponges	Sponge hooks		Diving outfits		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sheepswool	87, 284	$191, 695	234, 600	$616, 927	321, 884	$808, 622
Yellow	47, 601	14, 959	63, 013	29, 407	110, 614	44, 366
Grass	79, 088	20, 551	6, 075	1, 683	85, 163	22, 234
Wire			11, 060	4, 424	11, 060	4, 424
Total	213, 973	227, 205	314, 748	652, 441	528, 721	879, 646

Sponges sold at the Exchange, Tarpon Springs, Fla., 1927–30, and the 5-year average 1922–26

Year	Large wool		Small wool		Yellow	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1922–1926 (average)	246, 852	$600, 305	47, 767	$51, 223	92, 141	$38, 696
1927	252, 463	752, 435	35, 413	61, 973	65, 429	32, 714
1928	232, 208	623, 776	33, 744	50, 616	61, 358	28, 633
1929	206, 338	606, 844	32, 635	48, 952	68, 776	32, 096
1930	258, 110	689, 670	41, 434	60, 908	57, 039	33, 083

Year	Grass		Wire		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1922–1926 (average)	53, 283	$12, 095	8, 918	$3, 567	448, 961	$705, 886
1927	50, 495	14, 139	10, 617	4, 249	414, 417	865, 510
1928	74, 698	20, 925	11, 190	5, 968	413, 198	729, 918
1929	59, 705	14, 329	11, 060	4, 424	378, 514	706, 645
1930	54, 208	17, 346	3, 291	1, 931	414, 082	802, 938

ALABAMA

The fisheries and industries related to the fisheries of Alabama in 1929 employed 1,095 persons, which is 11 per cent less than the number employed in 1928. Of the total number of persons, 781 were fishermen, 12 were employed on transporting vessels, 95 in the wholesale trade, and 207 in manufacturing industries. Of the fishermen, 2 were engaged also in the manufacturing of prepared fishery products.

The total catch amounted to 9,024,539 pounds, valued at $410,325, which is a decrease of 38 per cent in the catch and 30 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, shrimp accounted for 38 per cent; red snapper, 25 per cent; and mullet, 18 per cent. Of the total weight of the catch, shrimp accounted for 49 per cent; mullet, 18 per cent; and red snapper, 14 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Alabama during 1929 was taken by 781 fishermen, who used 34 motor vessels, 4 sailing vessels, 449 motor and other small boats, and 9 major types of gear. The vessels had a combined capacity of 430 net tons. The fisheries accounting for the greatest number of persons were the otter-trawl fishery employing 285 fishermen and the hand-line fishery employing 148 fishermen.

CATCH BY GEAR

Four types of gear accounted for 94 per cent of fishery products taken in the fisheries of Alabama during 1929. Listed in order of their importance they were: Otter trawls, which accounted for 49 per cent of the catch; trammel nets, 18 per cent; lines, 17 per cent; and haul seines, 10 per cent. The catch by otter trawls consisted almost exclusively of shrimp; that by trammel nets principally mullet; that by lines chiefly red snapper; and that by haul seines principally mullet.

OPERATING UNITS BY COUNTIES

Fisheries of Alabama are confined to Baldwin and Mobile Counties. Mobile County accounted for 83 per cent of the number of persons fishing, 82 per cent of the fishing vessels, and 80 per cent of the motor and other small fishing boats.

CATCH BY COUNTIES

Of the two counties of Alabama in which marine fisheries were prosecuted during 1929, Mobile County was by far the most important, accounting for 85 per cent of the total catch and 84 per cent of the total value of the catch. Baldwin County accounted for the remaining 15 per cent of the catch and 16 per cent of the value.

Fisheries of Alabama, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines, common	Gill nets, stake	Trammel nets	Lines		
				Hand	Trot with baits or snoods	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			14	98		
On boats and shore—						
Regular	53	2	105	36	28	43
Casual			11	14	2	6
Total	53	2	130	148	30	49
Vessels:						
Motor—						
5 to 10 tons			3	2		
11 to 20 tons				7		
61 to 70 tons				1		
Total			3	10		
Net tonnage			25	177		
Boats:						
Motor	15	1	47	5	3	4
Other	3	2	112	24	27	49
Apparatus:						
Number	9	20	126	148	30	171
Length, yards	7, 000					
Square yards		3, 000	37, 672			
Hooks, baits, or snoods				262	5, 650	17, 100

Items	Fyke nets	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		45		31	4		179
On boats and shore—							
Regular	27	240	28		73	6	545
Casual			14		15		57
Total	27	285	42	31	92	6	781
Vessels:							
Motor—							
5 to 10 tons		18		2	2		23
11 to 20 tons		2		1			10
61 to 70 tons							1
Total		20		3	2		34
Net tonnage		159		37	15		379
Sail—							
5 to 10 tons				1			1
11 to 20 tons				3			3
Total				4			4
Net tonnage				51			51
Total vessels		20		7	2		38
Total net tonnage		159		88	15		430
Boats:							
Motor	4	120			30		212
Other	27				49		237
Apparatus:							
Number	110	140	42	14	92	6	
Yards at mouth		1, 816		14			

Fisheries of Alabama, 1929—Continued

CATCH: BY GEAR

Species	Haul seines, common		Gill nets, stake		Trammel nets		Lines: Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	92, 574	$5, 286			10, 876	$414		
Bluerunner or hardtail	3, 316	102			4, 382	121		
Buffalofish					157	9		
Catfish and bullheads	487	35			4, 795	465	835	$84
Crevalle	20, 609	624			2, 604	119		
Croaker	858	34			36, 140	1, 305	1, 061	39
Drum:								
Black	20, 676	1, 034			3, 047	167		
Red	32, 369	2, 389			68, 876	6, 393	3, 473	324
Flounders	220	22			10, 986	1, 072	59	6
Groupers							154, 006	4, 882
Jewfish							150	6
King whiting or "kingfish"	200	8			1, 696	49		
Mullet	650, 554	23, 666			1, 375, 210	50, 261		
Pompano	700	147			815	192		
Sheepshead	9, 175	678			37, 020	3, 442	642	62
Snapper, red							1, 227, 601	102, 176
Spadefish	766	31			527	19		
Spanish mackerel	9, 650	737			222	10		
Spot	2, 438	88			4, 603	156	88	6
Squeteagues or "sea trout"	24, 880	2, 488			91, 681	8, 642	11, 744	1, 150
Sturgeon			2, 850	$810				
Tripletail	150	6			556	25	220	10
Terrapin	100	23			26	8		
Turtles					100	8		
Total	869, 722	37, 398	2, 850	810	1, 654, 319	72, 877	1, 399, 879	108, 745

Species	Lines—Continued: Trot with baits or snoods		Lines—Continued: Trot with hooks		Fykes net		Otter trawls, shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish			7, 930	$456	55, 990	$3, 063		
Catfish and bullheads			66, 841	5, 169	38, 720	2, 816		
Paddlefish or spoonbill cat			247	22	2, 821	256		
Sunfish					870	87		
Crabs: Hard	101, 508	$2, 563					1, 720	$42
Shrimp							4, 396, 400	154, 139
Total	101, 508	2, 563	75, 018	5, 647	98, 401	6, 222	4, 398, 120	154, 181

Species	Spears		Dredges, oyster		Tongs		By Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	20, 794	$1, 984						
Crabs: Soft							3, 600	$850
Oysters:								
Market, public			225, 568	$3, 373	73, 556	$4, 779		
Market, private					100, 800	10, 800		
Terrapin							404	96
Total	20, 794	1, 984	225, 568	3, 373	174, 356	15, 579	4, 004	946

Fisheries of Alabama, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Baldwin	Mobile
Fishermen:	*Number*	*Number*
On vessels	20	159
On boats and shore—		
Regular	99	446
Casual	12	45
Total	131	650
Vessels:		
Motor—		
5 to 10 tons	6	17
11 to 20 tons	1	9
61 to 70 tons		1
Total	7	27
Net tonnage	56	323
Sail—		
5 to 10 tons		1
11 to 20 tons		3
Total		4
Net tonnage		51
Total vessels	7	31
Total net tonnage	56	374

Items	Baldwin	Mobile
Boats:	*Number*	*Number*
Motor	33	179
Other	57	180
Apparatus:		
Haul seines, common	1	8
Length, yards	500	6, 500
Gill nets, stake	20	
Square yards	3, 000	
Trammel nets	58	68
Square yards	17, 873	19, 799
Lines—		
Hand	11	137
Hooks	11	251
Trot with baits or snoods	10	20
Baits or snoods	2, 500	3, 150
Trot with hooks	8	163
Hooks	800	16, 300
Fyke nets		110
Otter trawls, shrimp	12	128
Yards at mouth	153	1, 663
Spears	15	27
Dredges, oyster		14
Yards at mouth		14
Tongs	13	79

CATCH: BY COUNTIES

Species	Baldwin		Mobile	
	Pounds	*Value*	*Pounds*	*Value*
Bluefish	3, 205	$118	100, 245	$5, 582
Bluerunner or hardtail	3, 640	100	4, 058	123
Buffalofish			64, 077	3, 528
Catfish and bullheads	6, 315	609	105, 363	7, 960
Crevalle	434	21	22, 779	722
Croaker	26, 033	949	12, 026	429
Drum:				
Black	2, 500	124	21, 223	1, 077
Red	37, 370	3, 446	67, 348	5, 660
Flounders	7, 007	652	25, 052	2, 432
Groupers			154, 006	4, 882
Jewfish			150	6
King whiting or "kingfish"			1, 896	57
Mullet	850, 060	34, 002	1, 175, 704	39, 925
Paddlefish or spoonbill cat			3, 068	278
Pompano	441	103	1, 074	236
Sheepshead	17, 118	1, 581	29, 719	2, 601
Snapper, red			1, 227, 601	102, 176
Spadefish	286	10	1, 007	40
Spanish mackerel	3, 566	178	6, 306	569
Spot	1, 748	66	5, 381	184
Squeteagues or "sea trout"	45, 767	4, 278	82, 538	8, 002
Sturgeon	2, 850	810		
Sunfish			870	87
Tripletail	198	9	728	32
Crabs:				
Hard	32, 600	840	70, 628	1, 765
Soft			3, 600	850
Shrimp	279, 200	10, 331	4, 117, 200	143, 808
Oysters:				
Market, public	3, 136	224	295, 988	7, 928
Market, private	58, 520	6, 270	42, 280	4, 530
Terrapin	26	8	504	119
Turtles			100	8
Total	1, 382, 020	64, 729	7, 642, 519	345, 596

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 12 persons in Alabama engaged primarily in transporting fishery products by means of vessels. In this trade 6 motor vessels, having a combined capacity of 55 net tons, were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 10 wholesale establishments in Alabama engaged primarily in handling fresh and frozen products. These establishments employed 95 persons, who received $85,153 in salaries and wages. All of the wholesale establishments were located in Mobile and Baldwin Counties.

Manufacturing.—There were seven establishments in Alabama in 1929 engaged primarily in the manufacturing of fishery products or by-products. They employed 207 persons, who received $87,404 in salaries and wages. The products manufactured, consisting principally of canned shrimp and oysters, and salted mullet, were valued at $442,002. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were two fishermen in Alabama preparing fishery products. Their output, consisting entirely of sturgeon roe, amounted to 109 pounds, valued at $88.

Industries related to the fisheries of Alabama, 1929

TRANSPORTING

Items	Number
Persons engaged: On transporting vessels	12
Transporting vessels:	
Motor—	
5 to 10 tons	5
11 to 20 tons	1
Total vessels	6
Total net tonnage	55

WHOLESALE

Items	Mobile and Baldwin Counties	Items	Mobile and Baldwin Counties
Establishments	10	Paid to salaried employees	$50,210
Persons engaged:		Paid to wage earners	34,943
Proprietors	14		
Salaried employees	13	Total salaries and wages	85,153
Wage earners	68		

MANUFACTURING

Items	Number	Products[1]	Quantity	Value
Establishments	7	Salted mullet ... pounds	308,000	$17,400
Persons engaged:		Canned:		
Proprietors	9	Oysters ... standard cases[2]	14,521	74,845
Salaried employees	7	Shrimp—		
Wage earners	191	Dry pack, tins ... do	36,366	203,492
		Wet pack, tins ... do	18,848	106,919
Paid to salaried employees	$20,175	Other products[3]		39,346
Paid to wage earners	67,229	Total		442,002
Total salaries and wages	87,404			

[1] Includes a small amount of salted products prepared by 4 firms whose activities were principally in the wholesale fishery industry.

[2] A standard case contains forty-eight 5-ounce cans of oysters, forty-eight 5-ounce cans in the dry pack or forty-eight 5¾-ounce cans in the wet pack of shrimp.

[3] Includes salted mullet roe, shrimp meal, and oyster-shell products.

Industries related to the fisheries of Alabama, 1929—Continued

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged...number	2	----------
Products: Fresh sturgeon roe...pounds	109	$88

MISSISSIPPI

The fisheries and industries related to the fisheries of Mississippi in 1929 employed 3,854 persons, which is 19 per cent more than the number employed during 1928. Of the total number of persons, 2,447 were fishermen, 6 were employed on transporting vessels, 317 in the wholesale trade, and 1,084 in manufacturing industries.

The total catch amounted to 34,629,156 pounds, valued at $1,005,301, which is an increase of 13 per cent in the catch but a decrease of 5 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, oysters accounted for 45 per cent and shrimp 42 per cent. Of the total weight of the catch, oysters accounted for 54 per cent; shrimp, 13 per cent; and crabs, 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Mississippi during 1929 was taken by 2,447 fishermen, who used 124 motor vessels, 14 sailing vessels, 1,184 motor and other small fishing boats, and 9 major types of gear. The vessels had a combined capacity of 1,885 net tons. The fisheries accounting for the greatest number of persons were the otter-trawl fishery employing 975 fishermen, the oyster dredge fishery employing 878 fishermen, and the tong fishery employing 513 fishermen.

CATCH BY GEAR

Two types of gear caught 86 per cent of the fishery products taken in the marine fisheries of Mississippi during 1929. Listed in order of their importance they were: Dredges, which accounted for 49 per cent of the catch; and otter trawls, which accounted for 37 per cent of the catch. The catch by dredges was entirely oysters and that by otter trawls was principally shrimp.

OPERATING UNITS BY COUNTIES

Only three counties in Mississippi are represented in the marine fisheries. Harrison was by far the most important of these, accounting for 84 per cent of the total number of fishermen, 95 per cent of the total number of vessels, and 78 per cent of the small fishing boats. Jackson County ranked second with 13 per cent of the fishermen, 5 per cent of the vessels, and 19 per cent of the small fishing boats.

CATCH BY COUNTIES

Of the three counties represented in the marine fisheries of Mississippi, Harrison County accounted for 88 per cent of the total catch and 83 per cent of the total value of the catch. Jackson County ranked second with 10 per cent of the catch and 14 per cent of the value, while Hancock County accounted for 1 per cent of the catch and 3 per cent of the value.

Fisheries of Mississippi, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines, common	Trammel nets	Lines		Dip nets, drop	Cast nets
			Hand	Trot with baits or snoods		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			10			
On boats and shore—						
Regular	47	94	81	124	8	7
Casual	4		52		2	43
Total	51	94	143	124	10	50
Vessels:						
Motor—						
5 to 10 tons			1			
11 to 20 tons			1			
Total			2			
Net tonnage			25			
Boats:						
Motor	13	27	5			
Other	16	76	112	124	10	
Apparatus:						
Number	15	59	143	124	320	50
Length, yards	4, 087					
Square yards		25, 905				
Hooks, baits or snoods			143	48, 430		

Items	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	362		581			606
On boats and shore—						
Regular	711	43	297	491	21	1, 681
Casual	2	54		22	32	160
Total	975	97	878	513	53	2, 447
Vessels:						
Motor—						
5 to 10 tons	26		39			43
11 to 20 tons	29		68			70
21 to 30 tons	6		10			10
31 to 40 tons			1			1
Total	61		118			124
Net tonnage	769		1, 607			1, 667
Sail—						
5 to 10 tons			2			2
11 to 20 tons	1		11			11
21 to 30 tons			1			1
Total	1		14			14
Net tonnage	14		218			218
Total vessels	62		132			138
Total net tonnage	783		1, 825			1, 885
Boats:						
Motor	332		68	90		426
Other				499		758
Apparatus:						
Number	394	97	394	513		
Yards at mouth	5, 008		391			

Fisheries of Mississippi, 1929—Continued

CATCH: BY GEAR

Species	Haul seines, common		Trammel nets		Lines			
					Hand		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	505	$37	15, 326	$1, 120				
Bluerunner or hardtail	308	9	825	24	88	$2		
Cabio or crab eater			3, 410	104	1, 413	50		
Catfish and bull heads	14, 960	450	34, 973	1, 231	40, 865	1, 434		
Crevalle			1, 452	52	1, 045	38		
Croaker	14, 618	444	14, 982	463	26, 730	955		
Drum:								
Black	2, 481	144	10, 556	590	720	40		
Red	20, 036	1, 639	82, 034	6, 968	26, 798	2, 241		
Flounders	1, 232	134	14, 504	1, 568				
Groupers					24, 930	657		
Jewfish					1, 353	37		
Kingfish or "king mackerel"			247	21	55	5		
King whiting or "kingfish"	11, 330	309	11, 468	343	8, 470	301		
Mullet	320, 687	12, 707	267, 205	10, 568				
Pigfish	880	32	235	10				
Pompano	38	7	864	170				
Sea bass	880	80	3, 003	343				
Sheepshead	4, 106	325	27, 236	2, 235	6, 957	492		
Snapper, red					90, 864	7, 194		
Spadefish	110	6	440	24				
Spanish mackerel			526	57	979	89		
Spot	13, 255	415	13, 724	452	330	12		
Squeteagues or "sea trout"	45, 088	3, 067	165, 967	14, 731	172, 882	10, 598		
Tripletail			902	49	1, 842	93		
Crabs: Hard							1, 216, 116	$31, 033
Shrimp	179, 700	6, 820						
Terrapin			600	140				
Total	630, 214	26, 625	670, 479	41, 163	406, 321	24, 238	1, 216, 116	31, 033

Species	Dip nets, drop		Cast nets		Otter trawls, shrimp		Spears	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			880	$32				
Croaker			2, 970	108				
Flounders					8, 360	$380	36, 982	$5, 611
King whiting or "kingfish"					1, 320	36		
Mullet			12, 940	448				
Spot			1, 540	46				
Crabs: Hard	31, 050	$2, 070						
Shrimp			2, 090	744	12, 919, 660	413, 927		
Total	31, 050	2, 070	20, 420	1, 378	12, 929, 340	414, 343	36, 982	5, 611

Species	Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs: Soft					12, 052	$3, 984
Oysters:						
Market, public, Mississippi	6, 885, 144	$147, 747	1, 204, 608	$55, 199		
Market, public, Louisiana	10, 065, 490	224, 307	454, 840	23, 653		
Market, private, Mississippi			39, 200	2, 520		
Market, private, Louisiana			25, 200	360		
Terrapin			980	334	720	636
Total	16, 950, 634	372, 054	1, 724, 828	82, 066	12, 772	4, 620

Fisheries of Mississippi, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Hancock	Harrison	Jackson
Fishermen:	*Number*	*Number*	*Number*
On vessels	-----	574	32
On boats and shore—			
Regular	55	1,369	257
Casual	14	117	29
Total	69	2,060	318
Vessels:			
Motor—			
5 to 10 tons	-----	41	2
11 to 20 tons	-----	65	5
21 to 30 tons	-----	10	-----
31 to 40 tons	-----	1	-----
Total	-----	117	7
Net tonnage	-----	1,570	97
Sail—			
5 to 10 tons	-----	2	-----
11 to 20 tons	-----	11	-----
21 to 30 tons	-----	1	-----
Total	-----	14	-----
Net tonnage	-----	218	-----
Total vessels	-----	131	7
Total net tonnage	-----	1,788	97
Boats:			
Motor	9	361	56
Other	35	557	166
Apparatus:			
Haul seines, common	-----	4	11
Length, yards	-----	962	3,125
Trammel nets	7	24	28
Square yards	2,545	13,320	10,040
Lines—			
Hand	16	71	56
Hooks	16	71	56
Trot with baits or snoods	-----	112	12
Baits or snoods	-----	38,850	9,580
Dip nets, drop	320	-----	-----
Cast nets	-----	46	4
Otter trawls, shrimp	2	355	37
Yards at mouth	24	4,528	456
Spears	6	57	34
Dredges, oyster	3	379	12
Yards at mouth	-----	379	12
Tongs	19	406	88

CATCH: BY COUNTIES

Species	Hancock		Harrison		Jackson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	-----	-----	742	$59	15,089	$1,098
Bluerunner or hardtail	-----	-----	319	10	902	25
Cabio or crab eater	-----	-----	3,410	115	1,413	39
Catfish and bullheads	-----	-----	73,242	2,619	18,436	528
Crevalle	-----	-----	2,365	86	132	4
Croaker	440	$16	43,802	1,492	15,058	462
Drum:						
Black	412	26	9,905	516	3,440	232
Red	22,440	2,040	73,145	6,043	33,283	2,765
Flounders	11,660	1,518	36,080	4,274	13,338	1,901
Groupers	-----	-----	-----	-----	24,930	657
Jewfish	-----	-----	-----	-----	1,353	37
Kingfish or "king mackerel"	-----	-----	302	26	-----	-----
King whiting or "kingfish"	-----	-----	25,786	803	6,802	186
Mullet	7,700	280	68,582	2,461	524,550	20,982
Pigfish	-----	-----	484	18	631	24
Pompano	16	5	246	54	640	118
Sea bass	-----	-----	2,068	188	1,815	235
Sheepshead	8,360	760	16,280	1,220	13,659	1,072
Snapper, red	-----	-----	-----	-----	90,864	7,194
Spadefish	-----	-----	550	30	-----	-----

Fisheries of Mississippi, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Hancock		Harrison		Jackson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Spanish mackerel	70	$7	$1, 188	$108	$247	$31
Spot	1, 650	60	19, 620	636	7, 579	229
Squeteagues or "sea trout"	51, 260	3, 832	186, 358	12, 864	146, 319	11, 700
Tripletail			2, 530	130	214	12
Crabs:						
Hard	31, 050	2, 070	1, 156, 796	29, 789	59, 320	1, 244
Soft	1, 846	646	10, 206	3, 338		
Shrimp	8, 400	378	11, 222, 910	353, 262	1, 870, 140	67, 851
Oysters:						
Market, public, Mississippi	128, 800	8, 600	7, 515, 592	177, 672	445, 360	16, 674
Market, public, Louisiana	132, 888	5, 221	10, 046, 038	235, 423	341, 404	7, 316
Market, private, Mississippi			39, 200	2, 520		
Market, private, Louisiana			25, 200	360		
Terrapin	120	36	1, 580	934	600	140
Total	407, 112	25, 495	30, 584, 526	837, 050	3, 637, 518	142, 756

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 6 persons in Mississippi engaged primarily in transporting fishery products by means of vessels. In this trade 2 motor vessels and 1 sailing vessel, having a combined capacity of 36 net tons, were operated.

Wholesale.—There were 25 wholesale establishments in Mississippi engaged primarily in handling fresh and frozen products. These establishments employed 317 persons who received $127,496 in salaries and wages. Harrison County alone accounted for 19 of these establishments.

Manufacturing.—There were 29 establishments in Mississippi in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 1,084 persons, who received $528,089 in salaries and wages. The products manufactured, consisting principally of canned shrimp and oysters, and oyster-shell products, were valued at $2,533,466. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Industries related to the fisheries of Mississippi, 1929

TRANSPORTING

Items	Number	Items	Number
Persons engaged:		Transporting vessels—Continued.	
On transporting vessels	6	Sail—	
ransporting vessels:		11 to 20 tons	1
Motor—		Net tonnage	15
5 to 10 tons	1	Total vessels	3
11 to 20 tons	1	Total net tonnage	36
Total	2		
Net tonnage	21		

Industries related to the fisheries of Mississippi, 1929—Continued

WHOLESALE

Items	Harrison County	Jackson and Hancock Counties	Total
Establishments	19	6	25
Persons engaged:			
Proprietors	27	7	34
Salaried employees	4	5	9
Wage earners	236	38	274
Paid to salaried employees	$21,898	$10,650	$32,548
Paid to wage earners	81,853	13,095	94,948
Total, salaries and wages	103,751	23,745	127.496

MANUFACTURING

Items	Number	Products [1]	Quantity	Value
Establishments	29	Canned:		
Persons engaged:		Oysters — standard cases [2]	286,186	$1,469,104
Proprietors	45	Shrimp—		
Salaried employees	27	Dry pack, tins — do	46,918	255,582
Wage earners	1,012	Wet pack, tins — do	92,015	509,694
		Wet pack, glass — do	1,374	15,050
Paid to salaried employees	$123,284	Oyster-shell products:		
Paid to wage earners	404.805	Poultry feed — tons	27,670	202.132
		Lime — do	4,518	4,418
Total salaries and wages	528,089	Other products [3]		77,486
		Total		2,533,466

[1] Includes the production of 2 firms whose activities were principally in the wholesale trade.

[2] A standard case contains forty-eight 5-ounce cans of oysters; forty-eight 5-ounce cans in the dry pack, of forty-eight 5¾-ounce cans in the wet pack of shrimp.

[3] Includes salted mullet, canned crabs, and shrimp meal.

LOUISIANA

The fisheries and industries related to the fisheries of Louisiana in 1929 employed 5,918 persons, which is 13 per cent less than the number employed in 1928. Of the total number of persons employed, 3,709 were fishermen, 472 were engaged on transporting vessels and boats, 372 in the wholesale trade, and 1,665 in manufacturing industries. Of the number employed on transporting vessels and boats, 300 represent a duplication of those persons shown as fishermen. Of the fishermen, 3 also were engaged in the manufacture of prepared fishery products.

The total catch amounted to 61,919,905 pounds, valued at $2,764,673, which is a decrease of 11 per cent in the catch and 21 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of shrimp accounted for 73 per cent; oysters, 16 per cent; and crabs, 4 per cent. Of the total weight of the catch, shrimp accounted for 80 per cent; oysters, 13 per cent; and crabs, 4 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Louisiana during 1929 was taken by 3,709 fishermen who used 103 motor vessels, 2,305 motor and other small boats, and 7 major types of gear. The vessels had a combined capacity of 741 net tons. The fisheries accounting for the greatest number of persons were the otter-trawl fishery employing 2,018 fishermen and the haul-seine fishery employing 763 fishermen.

CATCH BY GEAR

Three types of gear accounted for 90 per cent of the fishery products taken in the fisheries of Louisiana during 1929. Listed in order of their importance they were: Otter trawls, which accounted for 74 per cent of the catch; tongs, 9 per cent; and haul seines, 7 per cent. The catch by otter trawls was exclusively shrimp, that by tongs entirely oysters, and that by haul seines principally shrimp.

OPERATING UNITS BY PARISHES

Terrebonne Parish was foremost in the number of persons fishing, accounting for 22 per cent of the total. Jefferson Parish followed with 20 per cent. Other parishes employing a considerable number of fishermen listed in order of their importance in this respect were La Fourche, Plaquemines, and St. Bernard. Terrebonne Parish accounted for 38 per cent of the total number of fishing vessels and La Fourche Parish 28 per cent. Terrebonne Parish also led in the number of motor and other small fishing boats, accounting for 23 per cent of the total. Jefferson Parish followed with 19 per cent.

CATCH BY PARISHES

Fishing was prosecuted in the marine waters of 14 parishes of Louisiana during 1929. Ranked according to value, the fisheries of La Fourche Parish were most important, accounting for 25 per cent of the total catch and 23 per cent of the total value of the catch. Jefferson Parish ranked second, accounting for 24 per cent of the total catch and 23 per cent of the value. Other important producing parishes listed in order with respect to value of the catch were Terrebonne, Plaquemines, Orleans, and St. Bernard.

Fisheries of Louisiana, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines, common	Trammel nets	Lines		
			Hand	Trot with baits or snoods	Trot with hooks
Fishermen:					
On boats and shore—	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	657	144	65	147	4
Casual	106	22	16	166	3
Total	763	166	81	313	7
Boats:					
Motor	142	59	1	22	
Other	68	22	76	275	7
Apparatus:					
Number	200	72	81	330	14
Length, yards	33,824				
Square yards		29,605			
Hooks, baits or snoods			86	53,605	1,900

Fisheries of Louisiana, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Dip nets, drop	Otter trawls, shrimp	Dredges, oyster	Tongs	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	--------	182	44	2	228
On boats and shore—					
Regular	11	1,812	--------	650	3,078
Casual	19	24	--------	77	403
Total	30	2,018	44	729	3,709
Vessels:					
Motor—					
5 to 10 tons	--------	83	9	1	93
11 to 20 tons	--------	6	3	--------	9
21 to 30 tons	--------	1	--------	--------	1
Total vessels	--------	90	12	1	103
Total net tonnage	--------	623	111	7	741
Boats:					
Motor	--------	923	--------	49	1,197
Other	30	--------	--------	672	1,108
Apparatus:					
Number	1,633	1,013	20	729	--------
Yards, at mouth	--------	12,383	20	--------	--------

CATCH: BY GEAR

Species	Haul seines, common		Trammel nets		Lines, hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	167	$28	--------	--------	--------	--------
Bonito	150	30	--------	--------	--------	--------
Catfish and bullheads	25,923	1,129	16,414	$811	1,672	$67
Croaker	34,782	1,410	45,865	1,920	--------	--------
Drum:						
Black	166,749	9,179	88,142	5,812	11,476	574
Red	208,857	20,363	176,498	17,162	59,508	5,951
Flounders	7,307	731	17,772	1,879	310	31
Garfish	800	16	--------	--------	--------	--------
Groupers	--------	--------	--------	--------	4,000	240
Jewfish	--------	--------	--------	--------	10,000	4,000
King whiting or "kingfish"	30,099	1,506	10,785	538	945	48
Mullet	55,841	2,814	13,650	682	--------	--------
Pompano	808	231	--------	--------	--------	--------
Sea bass	150	15	--------	--------	--------	--------
Sheepshead	37,920	3,719	61,594	5,922	993	100
Snapper, red	--------	--------	--------	--------	80,000	10,400
Spanish mackerel	3,380	356	5,730	573	--------	--------
Spot	10,061	576	31,435	1,716	--------	--------
Squeteagues or "sea trout"	286,639	38,743	185,409	27,118	40,720	4,887
Yellowtail	975	39	200	8	--------	--------
Shrimp	3,582,317	144,646	1,500	75	--------	--------
Terrapin	67,000	26,100	--------	--------	--------	--------
Total	4,519,925	251,631	654,994	64,216	209,624	26,298

Species	Lines				Dip nets, drop	
	Trot, with baits or snoods		Trot, with hooks			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	--------	--------	8,240	$320	--------	--------
Crabs:						
Hard	2,652,338	$76,253	--------	--------	22,400	$2,240
Soft	44,750	13,425	--------	--------	35,800	11,265
Total	2,697,088	89,678	8,240	320	58,200	13,505

Species	Otter trawls, shrimp		Dredges, oyster		Tongs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Shrimp	45,872,165	$1,880,615	--------	--------	--------	--------
Oysters:						
Market, public	--------	--------	804,699	$17,592	618,121	$15,379
Market, private	--------	--------	1,358,700	69,300	5,118,149	336,139
Total	45,872,165	1,880,615	2,163,399	86,892	5,736,270	351,518

Fisheries of Louisiana, 1929—Continued

OPERATING UNITS: BY PARISHES

Items	Calcasieu	Cameron	Iberia	Jefferson Davis	Jefferson	La Fourche	Orleans
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					14	61	37
On boats and shore—							
Regular	4	2	14	1	660	594	282
Casual	1	4	7		65	20	53
Total	5	6	21	1	739	675	372
Vessels:							
Motor—							
5 to 10 tons					4	28	9
11 to 20 tons					1	1	2
21 to 30 tons					1		
Total vessels					6	29	11
Total net tonnage					64	193	101
Boats:							
Motor	1	1	1	1	310	245	97
Other	4	5	16		126	172	36
Apparatus:							
Haul seines, common	2	1	1	1	76	12	21
Length, yards	567	200	200	117	10,831	2,100	4,040
Trammel nets					9	2	27
Square yards					1,800	700	11,666
Lines—							
Hand							5
Hooks							10
Trot, with baits or snoods			17		90	20	
Baits or snoods			680		17,800	3,800	
Trot, with hooks	6	4					
Hooks	900	600					
Dip nets, drop							1,058
Otter trawls, shrimp					289	262	61
Yards at mouth					3,680	3,397	738
Dredges, oyster					1	2	15
Yards at mouth					1	2	15
Tongs	4	3	12		40	153	36

Items	Plaquemines	St. Bernard	St. Charles	St. Mary	St. Tammany	Terrebonne	Vermilion
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	26	4		8		78	
On boats and shore—							
Regular	347	383	6	93	28	661	3
Casual	73	11		20	21	79	49
Total	446	398	6	121	49	818	52
Vessels:							
Motor—							
5 to 10 tons	11	1		3		37	
11 to 20 tons	1	1		1		2	
Total vessels	12	2		4		39	
Total net tonnage	80	19		41		243	
Boats:							
Motor	190	100	3	50	5	170	23
Other	141	187		30	25	364	2
Apparatus:							
Haul seines, common	11	21			6	30	18
Length, yards	2,475	4,675			870	5,570	1,999
Trammel nets	15	15			3		1
Square yards	7,660	6,545			1,134		100
Lines—							
Hand						76	
Hooks						76	
Trot, with baits or snoods	66	127				10	
Baits or snoods	13,200	16,375				1,750	
Trot, with hooks							4
Hooks							400
Dip nets, drop		50			525		
Otter trawls, shrimp	127	46	3	54		167	4
Yards at mouth	1,639	571	35	106		2,163	54
Dredges, oyster	2						
Yards at mouth	2						
Tongs	59	94		30	6	292	

Fisheries of Louisiana, 1929—Continued

CATCH: By parishes

Species	Calcasieu		Cameron		Iberia		Jefferson Davis		Jefferson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish									12	$1
Catfish and bullheads	4, 400	$176	1, 200	$48					6, 597	331
Croaker					40	$2			2, 497	117
Drum:										
Black									82, 071	6, 315
Red	605	48	78	6	60	5	1, 500	$15	53, 002	4, 563
Flounders									2, 772	394
King whiting or "kingfish"									5, 564	276
Mullet	2, 891	116	110	4					1, 080	54
Pompano									193	59
Sheepshead									9, 444	634
Spanish mackerel									300	42
Spot									680	28
Squeteagues or "sea trout"	1, 415	170	110	12	1, 000	120	500	5	47, 087	5, 721
Crabs: Hard					2, 400	60			781, 650	20, 067
Shrimp							10, 000	800	12, 395, 290	508, 212
Oysters:										
Market, public	5, 705	611	2, 240	240						
Market, private					231, 084	22, 008			1, 127, 918	52, 758
Terrapin									67, 000	26, 100
Total	15, 016	1, 121	3, 738	310	234, 584	22, 195	12, 000	820	14, 583, 157	625, 672

Species	La Fourche		Orleans		Plaquemines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			75	$11		
Bonito			50	10		
Catfish and bullheads			14, 600	689		
Croaker			19, 000	840	31, 950	$1, 278
Drum:						
Black	2, 000	$100	28, 800	1, 440	17, 600	880
Red	50, 000	5, 000	82, 300	8, 230	53, 150	5, 315
Flounders	500	50	5, 300	530	9, 475	947
Garfish			800	16		
Groupers			4, 000	240		
Jewfish			10, 000	4, 000		
King whiting or "kingfish"			2, 950	148	6, 850	343
Mullet			9, 400	470	6, 500	325
Pompano			100	20		
Sea bass			150	15		
Sheepshead			30, 200	3, 020	29, 250	2, 925
Snapper, red			80, 000	10, 400		
Spanish mackerel			1, 100	110	4, 830	483
Spot			18, 500	950	13, 575	815
Squeteagues or "sea trout"	11, 400	1, 368	142, 000	21, 180	40, 450	5, 618
Yellowtail			450	18	225	9
Crabs:						
Hard	118, 800	3, 564			98, 010	2, 939
Soft			20, 500	6, 150		
Shrimp	14, 479, 644	594, 362	3, 656, 302	149, 907	6, 728, 961	275, 784
Oysters:						
Market, public			804, 699	17, 592		
Market, private	828, 576	39, 456	1, 062, 600	60, 860	831, 894	43, 570
Total	15, 490, 920	643, 900	5, 993, 876	286, 846	7, 872, 720	341, 231

Fisheries of Louisiana, 1929—Continued

CATCH: BY PARISHES—Continued

Species	St. Bernard		St. Charles		St. Mary	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bonito	100	$20				
Catfish and bullheads	5,050	202				
Croaker	22,400	886				
Drum:						
Black	27,900	1,395				
Red	61,500	6,150				
Flounders	2,800	280				
King whiting or "kingfish"	1,100	55				
Mullet	6,100	305				
Pompano	125	24				
Sheepshead	17,100	1,710				
Spanish mackerel	1,050	106				
Spot	3,580	215				
Squeteagues or "sea trout"	113,300	16,995				
Yellowtail	500	20				
Crabs:						
Hard	1,642,650	49,310				
Soft	49,550	14,865				
Shrimp	2,620,726	107,497	184,984	$7,564	597,450	$23,924
Oysters:						
Market, public	610,176	14,528				
Market, private					384,657	22,523
Total	5,185,707	214,563	184,984	7,564	982,107	46,447

Species	St. Tammany		Terrebonne		Vermilion	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	80	$16				
Catfish and bullheads	3,250	250	14,512	$580	2,640	$96
Croaker	1,400	70	3,110	125	250	12
Drum:						
Black	1,750	123	106,246	5,312		
Red	8,100	810	128,418	12,842	6,150	492
Flounders	550	40	3,742	375	250	25
King whiting or "kingfish"	300	17	25,065	1,253		
Mullet	3,750	187	39,510	1,975	150	60
Pompano	300	105	90	23		
Sheepshead	7,450	745	7,013	702	50	5
Spanish mackerel	100	15	1,730	173		
Spot	2,100	130	3,061	154		
Squeteagues or "sea trout"	41,220	6,183	113,136	13,246	1,150	130
Crabs:						
Hard	22,400	2,240	8,828	313		
Soft	10,500	3,675				
Shrimp			8,612,495	353,113	170,130	4,173
Oysters: Market, private	37,800	4,600	1,972,320	159,664		
Total	141,050	19,161	11,039,276	549,850	180,770	4,993

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—In 1929 there were 472 persons in Louisiana engaged primarily in transporting fishery products by means of vessels and boats. In this trade 83 motor vessels, having a combined capacity of 633 net tons, and 214 undertonnage boats were operated. The size of vessel in most popular use ranged from 5 to 10 net tons.

Wholesale.—There were 33 wholesale establishments in Louisiana primarily engaged in handling fresh and frozen products. These establishments employed 372 persons who received $313,446 in salaries and wages. Orleans Parish alone accounted for 13 of these establishments.

Manufacturing.—There were 56 establishments in Louisiana in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 1,665 persons, who received $680,510 in salaries and wages. The products manufactured, consisting principally of dried and canned shrimp and oyster-shell products, were valued at $4,949,682. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095 entitled "Fishery Industries of the United States, 1929."

Fishermen's prepared products.—In addition to the output of prepared products by manufacturing firms, there were 3 fishermen in Louisiana preparing fishery products. Their output, consisting of dried shrimp and shrimp bran, amounted to 2 tons, valued at $508.

Industries related to the fisheries of Louisiana, 1929

TRANSPORTING

Items	Number
Persons engaged:	
On transporting vessels	166
On transporting boats	306
Total	472
Transporting vessels:	
Motor—	
5 to 10 tons	71
11 to 20 tons	12
Total vessels	83
Total net tonnage	633
Transporting boats	214

WHOLESALE

Items	Jefferson Parish	La Fourche and Calcasieu Parishes	Orleans Parish	Plaquemines and St. Tammany Parishes	Terrebonne Parish	Total
Establishments	4	3	13	4	9	33
Persons engaged:						
Proprietors	6	7	26	4	13	56
Salaried employees	2		34	1	9	46
Wage earners	11	14	89	35	121	270
Paid to salaried employees	$2,785	$1,000	$150,755	$200	$30,860	$185,600
Paid to wage earners	6,232	5,419	42,912	21,021	52,262	127,846
Total salaries and wages	9,017	6,419	193,667	21,221	83,122	313,446

MANUFACTURING

Items	Number	Products[1]	Quantity	Value
Establishments	56	Dried:		
Persons engaged:		Shrimp ... tons	1,294	$1,035,949
Proprietors	66	Squeteague ... pounds	31,400	7,850
Salaried employees	51	Canned:		
Wage earners	1,548	Oysters ... standard cases[2]	33,259	166,990
		Shrimp—		
Paid to salaried employees	$132,839	Dry pack, tins ... do	156,975	967,124
Paid to wage earners	547,671	Wet pack, tins and glass ... do	269,651	1,578,915
		Oyster-shell products:		
Total salaries and wages	680,510	Poultry feed ... tons	124,910	1,110,500
		Lime ... do	10,543	20,503
		Shrimp bran ... do	2,145	61,851
		Total		4,949,682

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[1] Includes a small amount of dried shrimp and shrimp bran prepared by 1 firm whose activities were principally in the wholesale fishery trade.

[2] A standard case contains forty-eight 5-ounce cans of oysters; forty-eight 5-ounce cans in the dry pack, or forty-eight 5¾-ounce cans in the wet pack of shrimp.

Industries related to the fisheries of Louisiana, 1929—Continued

FISHERMEN'S PREPARED PRODUCTS

Items	Quantity	Value
Fishermen engaged........number..	3	....
Products:		
Dried shrimp........tons..	1	$483
Shrimp bran........do....	1	25
Total........	2	508

TEXAS

The fisheries and industries related to the fisheries of Texas in 1929 employed 2,543 persons, which is 12 per cent less than the number employed during 1928. Of the total number of persons, 1,977 were fishermen, 361 were engaged in the wholesale trade, and 205 in manufacturing industries.

The total catch amounted to 16,624,114 pounds, valued at $907,342, which is an increase of 9 per cent in the catch and 4 per cent in the value of the catch, as compared with the catch and its value in the previous year. Of the total value of the catch, that of shrimp accounted for 36 per cent; squeteagues or "sea trout," 18 per cent; oysters, 16 per cent; and red drum, 12 per cent. Of the total weight of the catch, that of shrimp accounted for 57 per cent; oysters, 15 per cent; squeteagues, 7 per cent; black and red drum, each 6 per cent; and red snapper, 5 per cent.

OPERATING UNITS BY GEAR

The catch of fishery products in Texas during 1929 was taken by 1,977 fishermen who used 41 motor vessels, 1,372 motor and other small boats, and 11 major types of gear. The vessels had a combined capacity of 485 net tons. The fisheries accounting for the greatest number of persons were the hand-line fishery employing 526 fishermen and the otter-trawl fishery employing 454 fishermen.

CATCH BY GEAR

Four types of gear accounted for 86 per cent of the fishery products taken in the fisheries of Texas during 1929. Listed in order of their importance they were: Otter trawls which accounted for 57 per cent of the catch; haul seines, 12 per cent; lines, 9 per cent; and tongs, 8 per cent. The catch by otter trawls was exclusively shrimp; that by haul seines, principally black drum, squeteagues, and red drum; that by lines, principally red snapper, squeteagues, and red drum; and that by tongs, exclusively oysters.

OPERATING UNITS BY COUNTIES

Neuces County was foremost in the number of persons fishing, accounting for 27 per cent of the total number. Galveston County followed with 22 per cent. Other counties employing a considerable number of persons listed in order of their importance in this respect were Calhoun, Cameron, and Aransas. Galveston County accounted for 39 per cent of the total number of fishing vessels and Calhoun, 22 per cent. Neuces County led in the number of motor and other small boats, accounting for 25 per cent of the total and was followed by Galveston County with 24 per cent.

CATCH BY COUNTIES

Fishing was prosecuted in the marine waters of 12 counties of Texas during 1929. Ranked according to value, the fisheries of Galveston County were most important, accounting for 32 per cent of the total catch and 33 per cent of the total value of the catch. Neuces County was next in importance accounting for 21 per cent of the quantity and 19 per cent of the value. Other important producing counties listed in order of their importance with respect to the value of the catch were Calhoun, San Patricio, Cameron, Matagorda, and Aransas.

Fisheries of Texas, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines		Gill nets			Trammel nets
	Common	Long	Anchor	Drift	Set	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels						2
On boats and shore—						
Regular	225	198	52	14	69	140
Casual	83				3	8
Total	308	198	52	14	72	150
Vessels:						
Motor—						
5 to 10 tons						1
Net tonnage						7
Boats:						
Motor	27	1	25	6	28	81
Other	103	110	27	8	41	58
Apparatus:						
Number	134	78	112	6	295	113
Length, yards	28, 508	14, 166				
Square yards			27, 300	2, 400	52, 612	50, 204

Items	Lines				Dip nets	Cast nets
	Hand	Troll	Trot with baits or snoods	Trot with hooks		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	90					
On boats and shore—						
Regular	274	38	16	22	17	8
Casual	162			4	15	
Total	526	38	16	26	32	8
Vessels:						
Motor—						
5 to 10 tons	3					
11 to 20 tons	6					
21 to 30 tons	1					
31 to 40 tons	1					
41 to 50 tons	2					
Total vessels	13					
Total net tonnage	262					
Boats:						
Motor	146	38	2	7		
Other	198		16	20	32	
Apparatus:						
Number	522	146	16	46	114	8
Hooks, baits or snoods	637	146	9, 200	6, 480		

Fisheries of Texas, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Otter trawls, shrimp	Pots, crab	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	72			21	12		155
On boats and shore—							
Regular	382	2	135	79	318	18	1, 484
Casual			47		55		338
Total	454	2	182	100	385	18	1, 977
Vessels:							
Motor—							
5 to 10 tons	24			4	5		27
11 to 20 tons	4			2	1		10
21 to 30 tons							1
31 to 40 tons							1
41 to 50 tons							2
Total vessels	28			6	6		41
Total net tonnage	227			62	49		485
Boats:							
Motor	191		9	23	74		504
Other		1	34		250	18	868
Apparatus:							
Number	219	75	182	29	383		
Yards at mouth	3, 162			29			

CATCH: BY GEAR

Species	Haul seines				Gill nets			
	Common		Long		Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack	20, 000	$1, 375			3, 044	$182		
Bluefish			200	$24				
Catfish and bullheads	34, 471	1, 471	27, 250	882	8, 887	418		
Crevalle	100	4	600	22				
Croaker	10, 464	449	30, 117	1, 371	1, 800	72		
Drum:								
Black	40, 593	1, 673	746, 968	24, 488	29, 694	1, 204	10, 302	$309
Red	129, 102	15, 422	228, 663	20, 560	82, 957	10, 726	5, 361	429
Flounders	100	12	500	61	1, 000	168		
King whiting or "kingfish"	9, 841	514	2, 850	146	3, 300	132		
Mullet	10, 000	300	3, 000	90				
Pompano	1, 750	418	2, 896	439	2, 200	274		
Sheepshead	8, 587	601	17, 917	811	2, 425	106	100	5
Snook or sergeantfish	18, 000	1, 968	69, 795	5, 860	11, 500	1, 380		
Spanish mackerel	5, 150	1, 020	3, 009	361	300	42		
Spadefish	2, 953	162	1, 400	42				
Squeteagues or "sea trout"	118, 613	18, 872	376, 032	40, 025	74, 272	10, 648	21, 170	2, 117
Total	409, 724	44, 261	1, 511, 197	95, 182	221, 379	25, 352	36, 933	2, 860

Fisheries of Texas, 1929—Continued

CATCH: BY GEAR—Continued

Species	Gill nets, Set		Trammel nets		Lines, Hand		Lines, Troll	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack			7,932	$484	481	$29		
Bluefish					300	34		
Catfish and bullheads	5,060	$199	37,425	1,688	22,782	1,059		
Croaker	7,135	269	11,372	594	3,250	125		
Drum:								
Black	63,800	2,552	39,284	1,874	20,236	815		
Red	93,604	9,530	247,076	31,636	123,023	13,966		
Flounders	100	13	2,186	413	3,800	458		
Groupers					15,998	529		
Jewfish					43,859	2,921		
Kingfish or "king mackerel"							4,500	$180
King whiting or "kingfish"	2,180	174	9,028	543	1,500	85		
Pompano	1,000	250	1,509	313	940	223		
Sheepshead	3,420	227	8,076	656	5,095	303		
Snapper, red					804,140	72,847		
Snook or sergeantfish	4,200	421	5,304	534	4,400	480		
Spanish mackerel	50	5	2,450	416	30,500	3,845	46,000	4,600
Spadefish	100	5	964	72	200	10		
Squeteagues or "sea trout"	128,816	16,093	252,659	41,287	201,990	30,316		
Total	309,465	29,738	625,265	80,510	1,282,494	128,045	50,500	4,780

Species	Lines, Trot with baits or snoods		Lines, Trot with hooks		Dip nets		Cast nets		Otter trawls, shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Number*	*Value*
Catfish and bullheads			11,000	$440						
Drum:										
Black			400	16						
Red			24,000	2,540						
Snook or sergeantfish			100	10						
Squeteagues or "sea trout"			4,500	555						
Crabs: Hard	72,400	$5,280	50,732	$3,586						
Shrimp							12,000	$1,800	9,403,317	$325,208
Total	72,400	5,280	40,000	3,561	50,732	3,586	12,000	1,800	9,403,317	325,208

Species	Pots, crab		Spears		Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum: Red			500	$80						
Flounders			57,685	8,442						
Sheepshead			100	10						
Crabs: Hard	39,680	$2,480								
Oysters:										
Market, public					1,152,081	$42,220	1,233,162	$89,607	50,400	$5,040
Market, private							65,100	9,300		
Total	39,680	2,480	58,285	8,532	1,152,081	42,220	1,298,262	98,907	50,400	5,040

Fisheries of Texas, 1929—Continued

OPERATING UNITS: BY COUNTIES

Items	Aransas	Brazoria	Calhoun	Cameron	Chambers	Galveston
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2		23			91
On boats and shore—						
Regular	133	11	200	224	8	233
Casual	22		40			111
Total	157	11	263	224	8	435
Vessels:						
Motor—						
5 to 10 tons	1		7			6
11 to 20 tons			2			6
21 to 30 tons						1
31 to 40 tons						1
41 to 50 tons						2
Total vessels	1		9			16
Total net tonnage	7		76			281
Boats:						
Motor	49	4	93	7	4	111
Other	99	11	77	127	4	215
Apparatus:						
Haul seines—						
Common	3		6		4	49
Length, yards	600		1,916		1,600	9,800
Long	3			70		
Length, yards	1,000			12,000		
Gill nets—						
Anchor			14			48
Square yards			1,732			3,168
Drift				6		
Square yards				2,400		
Set	165					12
Square yards	29,500					792
Trammel nets	11	1	32			17
Square yards	4,180	800	18,266			7,600
Lines—						
Hand	41		58	6		141
Hooks	41		58	12		230
Trot with baits or snoods						10
Baits or snoods						5,600
Trot with hooks	16					
Hooks	3,200					
Dip nets	22					88
Otter trawls, shrimp	18		57			43
Yards at mouth	280		793			586
Pots, crab						75
Spears	29		41	10		30
Dredges, oyster	5		7			12
Yards at mouth	5		7			12
Tongs	34	11	31			84

Items	Harris	Jefferson	Matagorda	Neuces	Refugio	San Patricio
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2		8	23		6
On boats and shore—						
Regular	26	8	129	422	4	86
Casual	12	5	8	90	20	30
Total	40	13	145	535	24	122
Vessels:						
Motor—						
5 to 10 tons			4	6		3
11 to 20 tons	1			1		
Total vessels	1		4	7		3
Total net tonnage	11		31	57		22
Boats:						
Motor	17		50	131		38
Other	27	4	45	218	17	24

Fisheries of Texas, 1929—Continued

OPERATING UNITS: BY COUNTIES—Continued

Items	Harris	Jefferson	Matagorda	Neuces	Refugio	San Patricio
Apparatus:						
Haul seines—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Common	2	2	7	61		
Length, yards	500	350	2,725	11,017		
Long			1	4		
Length, yards			566	600		
Gill nets—						
Anchor			4			46
Square yards			4,000			18,400
Set				118		
Square yards				22,320		
Trammel nets	7		4	5		36
Square yards	2,006		1,622	1,330		14,400
Lines—						
Hand	4	4	8	208	12	40
Hooks	4	4	8	228	12	40
Troll				140		6
Hooks				140		6
Trot with baits or snoods	6					
Baits or snoods	3,600					
Trot with hooks			6	8	12	4
Hooks			480	1,000	1,000	800
Dip nets		4				
Cast nets		8				
Otter trawls, shrimp			21	44		36
Yards at mouth			283	685		535
Spears			40	27		5
Dredges, oyster			3	2		
Yards at mouth			3	2		
Tongs	16		62	133	12	

CATCH: BY COUNTIES

Species	Aransas		Brazoria		Calhoun		Cameron	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack					11,057	$663		
Bluefish							200	$24
Catfish and bullheads	17,300	$692			37,947	1,854	19,175	575
Crevalle	500	20					200	6
Croaker	10,350	414	1,800	$108	3,805	152	21,020	1,051
Drum:								
Black	36,500	1,460	1,600	96	24,022	959	549,333	16,480
Red	116,815	11,681	6,000	720	174,911	20,991	122,956	9,836
Flounders	9,500	1,140			12,882	1,932	3,000	360
Jewfish					1,650	99		
King whiting or "kingfish"	3,700	296			200	8		
Mullet							3,000	90
Pompano	1,400	350			100	20	1,157	174
Sheepshead	3,850	308	800	48	8,114	543	14,585	629
Snapper, red							9,109	1,093
Snook or sergeantfish	9,300	930			304	36	56,008	4,481
Spadefish							1,400	42
Spanish mackerel					1,750	263	400	48
Squeteagues or "sea trout"	150,462	18,055	4,800	624	151,523	22,728	314,523	31,452
Crabs: Hard	10,732	1,024						
Shrimp	463,098	16,553			1,409,255	49,168		
Oysters: Market, public	109,788	10,456	60,270	3,345	355,831	20,029	50,400	5,040
Total	943,295	63,379	75,270	4,941	2,193,351	119,445	1,166,466	71,381

Fisheries of Texas, 1929—Continued

CATCH: BY COUNTIES—Continued

Species	Chambers		Galveston		Harris		Jefferson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack	7, 500	$375			12, 900	$1, 032		
Catfish and bullheads	4, 000	200	22, 250	$909	13, 000	520	2, 000	$160
Croaker	200	10	4, 400	269	600	52	300	18
Drum:								
Black	200	10	9, 500	579	2, 300	226	400	24
Red	800	80	106, 890	17, 066	20, 000	3, 085	4, 400	792
Flounders			14, 700	2, 940	100	15		
Groupers			15, 998	529				
Jewfish			32, 550	2, 279				
King whiting or "kingfish"			11, 450	692	200	20	200	20
Mullet			10, 000	300				
Pompano			1, 540	308	50	10		
Sheepshead			3, 650	371	500	54	100	15
Snapper, red			736, 236	65, 114				
Snook or sergeantfish			100	16				
Spadefish			2, 145	156				
Spanish mackerel			13, 500	2, 700				
Squeteagues or "sea trout"	400	60	173, 800	34, 430	31, 500	6, 250	6, 850	1, 370
Crabs: Hard			118, 080	7, 772	28, 000	2, 100	6, 000	450
Shrimp			2, 979, 095	113, 326			12, 000	1, 800
Oysters:								
Market, public			1, 031, 800	37, 813	86, 520	8, 430		
Market, private			65, 100	9, 300				
Total	13, 100	735	5, 352, 784	296, 869	195, 670	21, 794	32, 250	4, 649

Species	Matagorda		Neuces		Refugio		San Patricio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			300	$34				
Catfish and bullheads	16, 928	$676	8, 375	335	3, 500	$140	2, 400	$96
Croaker	10, 016	401	9, 397	315	150	6	2, 100	84
Drum:								
Black	7, 815	313	287, 307	11, 492	700	28	31, 600	1, 264
Red	52, 984	5, 829	252, 530	25, 849	8, 000	800	68, 000	8, 160
Flounders	8, 789	1, 143	13, 000	1, 629			3, 400	408
Jewfish			6, 659	393			3, 000	150
Kingfish or "king mackerel"							4, 500	180
King whiting or "kingfish"	3, 349	134	6, 000	280			3, 600	144
Pompano	559	73	3, 489	734			2, 000	248
Sheepshead	2, 689	167	8, 732	473	150	9	2, 550	102
Snapper, red			58, 795	6, 640				
Snook or sergeantfish			35, 887	3, 790	200	20	11, 500	1, 380
Spadefish	1, 072	43	1, 000	50				
Spanish mackerel	150	20	55, 159	5, 588			16, 500	1, 670
Squeteagues or "sea trout"	54, 325	7, 062	223, 689	29, 385	3, 400	408	62, 780	8, 089
Shrimp	696, 217	20, 886	2, 258, 134	69, 046			1, 597, 518	56, 229
Oysters: Market, public	544, 614	32, 189	185, 920	18, 440	10, 500	1, 125		
Total	1, 399, 507	68, 936	3, 414, 373	174, 473	26, 600	2, 536	1, 811, 448	78, 204

INDUSTRIES RELATED TO THE FISHERIES

Wholesale.—There were 62 wholesale establishments in Texas in 1929 engaged primarily in handling fresh and frozen products. These establishments employed 361 persons, who received $183,105 in salaries and wages.

Manufacturing.—There were 9 establishments in Texas in 1929 engaged primarily in the manufacture of fishery products or by-products. They employed 205 persons, who received $103,452 in salaries and wages. The products manufactured, consisting principally of canned shrimp, were valued at $402,613. Detailed statistics of most of the production of canned fishery products and by-products may be obtained from Fisheries Document No. 1095, entitled "Fishery Industries of the United States, 1929."

Industries related to the fisheries of Texas, 1929

WHOLESALE

Items	Aransas County	Brazoria and Chambers Counties	Calhoun County	Cameron County	Galveston County	Harris County	Matagorda County	Neuces County	San Patricio County	Total
Establishments	4	3	11	6	13	4	6	11	4	62
Persons engaged:										
Proprietors	4	4	13	7	27	4	6	16	5	86
Salaried employees	5	------	4	3	6	------	2	7	1	28
Wage earners	19	6	47	20	52	7	53	31	12	247
Paid to salaried employees	$6,400	....	$7,768	$5,950	$26,850	.....	$780	$7,080	$1,800	$56,628
Paid to wage earners	8,121	$2,810	22,984	17,440	29,234	$3,265	22,669	14,410	5,544	126,477
Total salaries and wages	14,521	2,810	30,752	23,390	56,084	3,265	23,449	21,490	7,344	183,105

MANUFACTURING

Items	Number	Products	Quantity	Value
Establishments	9	Canned shrimp:		
Persons engaged:		Dry pack, tins, standard cases[1]	3,889	$24,142
Proprietors	12	Wet pack, glass do	51,525	344,487
Salaried employees	8	Other products[2]		33,984
Wage earners	185			
		Total		402,613
Paid to salaried employees	$21,520			
Paid to wage earners	81,932			
Total salaries and wages	103,452			

[1] A standard case contains forty-eight 5-ounce cans in the dry pack or forty-eight 5¾-ounce cans in the wet pack of shrimp.

[2] Includes canned oysters, salt shrimp, and oyster-shell products.

HISTORICAL REVIEW

Thirteen general surveys have been made for statistics of the fisheries of the South Atlantic and Gulf States during the 50 years from 1880 to 1929. Beginning with a catch of 66,513,000 pounds in 1880 it constantly increased until 1918 when the second largest catch on record was taken, due principally to the large catch of menhaden in that year. In 1929 the largest catch on record was taken, amounting to 535,395,000 pounds. Comparative statistics for the catch of each of the more important species throughout this period are shown in the following tables:

Fisheries of the South Atlantic and Gulf States, 1880 to 1929

SUMMARY: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Year	North Carolina		South Carolina		Georgia		Florida	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1880	32, 249	846	6, 143	212	2, 273	120	10, 663	643
1887	45, 123	773	4, 076	158	1, 883	81	(1)	(1)
1888	43, 023	776	4, 181	164	1, 958	83	(1)	976
1889	45, 546	950	4, 879	200	2, 644	106	29, 580	1, 148
1890	51, 799	1, 028	4, 945	202	2, 994	123	34, 882	1, 284
1897	64, 234	1, 316	5, 280	210	4, 993	171	34, 138	1, 081
1902	67, 585	1, 740	8, 175	263	11, 103	359	67, 704	1, 940
1908	101, 422	1, 776	14, 104	288	14, 828	701	74, 087	3, 389
1918	210, 502	2, 979	3, 747	208	37, 154	416	135, 935	5, 166
1923	95, 192	2, 414	6, 763	285	39, 897	668	140, 162	5, 746
1927	144, 466	2, 778	8, 374	351	47, 607	697	138, 423	6, 423
1928	141, 899	2, 629	7, 432	317	42, 069	866	131, 838	6, 250
1929	217, 595	2, 544	6, 135	275	43, 514	877	145, 953	6, 120

Year	Alabama		Mississippi		Louisiana		Texas		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1880	3, 541	119	789	23	6, 996	393	3, 859	128	66, 513	2, 484
1887	(1)	(1)	6, 548	190	18, 455	580	6, 282	256	(1)	(1)
1888	1, 634	76	7, 883	232	19, 121	613	6, 609	271	(1)	3, 191
1889	4, 560	147	8, 933	251	20. 947	621	7, 358	297	124, 447	3, 720
1890	4, 777	155	8, 132	246	20, 789	660	7, 959	314	136, 277	4, 012
1897	4, 699	134	7, 830	192	17, 402	714	7, 175	287	145, 751	4, 105
1902	9, 351	267	23, 427	553	24, 754	858	8, 044	354	220, 143	6, 334
1908	10, 665	387	17, 302	459	42, 302	1, 448	10, 439	446	285, 149	8, 894
1918	5, 609	231	20, 592	763	24, 954	1, 419	25, 015	677	463, 538	11, 859
1923	7, 631	342	25, 032	986	34, 835	1, 931	19, 560	782	389, 072	13, 184
1927	10, 076	437	34, 503	1, 259	56, 208	2, 864	21, 083	1, 054	460, 740	15, 863
1928	14, 466	587	30, 701	1, 060	69, 507	3, 478	15, 213	875	453, 125	16, 062
1929	9, 025	410	34, 629	1, 005	61, 920	2, 765	16, 624	908	535, 395	14, 904

[1] Statistics not available.

NOTE.—Florida statistics include Lake Okeechobee in 1927, 1928, and 1929.

CATCH OF CERTAIN SPECIES: BY STATES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Alewives					Bluefish				
	North Carolina	South Carolina	Georgia	Florida	Total	North Carolina	South Carolina	Georgia	Florida	Alabama
1880	15, 520	400	125	10	16, 055	600	200	5	69	-------
1887	23, 747	(1)	25	(1)	(1)	761	158	7	(1)	(1)
1888	20, 451	(1)	24	(1)	(1)	847	151	6	(1)	--------
1889	19, 316	37	36	(1)	(1)	1, 078	110	--------	369	58
1890	22, 112	29	24	10	22, 175	1, 539	100	--------	427	56
1897	20, 839	2	25	41	20, 907	1, 910	40	--------	311	--------
1902	15, 173	(1)	22	400	(1)	1, 049	1	--------	433	--------
1908	12, 530	(1)	32	1, 220	(1)	1, 258	7	--------	952	--------
1918	17, 356	10	(1)	692	18, 058	323	3	5	832	--------
1923	8, 959	(1)	(1)	1, 092	(1)	897	7	--------	1, 519	--------
1927	13, 911	(1)	(1)	213	(1)	852	13	--------	1, 392	46
1928	7, 808	2	(1)	370	(1)	754	4	50	989	31
1929	10, 768	(1)	(1)	408	(1)	631	--------	28	1, 122	103

[1] Statistics not available.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Bluefish				Cero and kingfish or "king mackerel"				
	Mississippi	Louisiana	Texas	Total	North Carolina	Florida	Mississippi	Texas	Total
1880				874	(1)	(1)			(1)
1887	73	13	7	(1)	(1)	(1)			(1)
1888	78	15	6	(1)	(1)	(1)			(1)
1889	90	13	24	1,742	(1)	(1)			(1)
1890	96	13	26	2,257	(1)	(1)			(1)
1897				2,261	(1)	(1)			(1)
1902				1,483	45	184			229
1908				2,217	(1)	(1)			(1)
1918				1,163	212	2,738			2,950
1923				2,423	(1)	2,530			2,531
1927	30	6	1	2,340	25	4,584		10	4,619
1928	27		1	1,856	2	3,965	1	11	3,979
1929	16	(2)	1	1,901	17	4,351	(2)	5	4,373

Year	Croaker								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1887	(1)	(1)	(1)	(1)	(1)	[3] 75	[3] 54	107	(1)
1888	(1)	(1)	(1)	(1)	(1)	[3] 79	[3] 55	110	(1)
1889	328	(1)	(1)	(1)	103	54	150	148	(1)
1890	354	(1)	(1)	(1)	98	57	158	176	(1)
1897	1,295	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1902	1,939	27	29	7	58	273	155	58	2,546
1908	1,177	85	46	92	72	176	369	159	2,176
1918	387	16	6	124	94	41	383	198	1,249
1923	2,262	26	(1)	22	37	45	219	68	(1)
1927	3,932	13	3	84	27	51	186	104	4,400
1928	6,775	12	10	86	46	56	169	85	7,239
1929	7,679	6	15	72	38	59	81	64	8,014

Year	Drum, black								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1887	(1)	90	10	(1)	(1)	2	(1)	(1)	(1)
1888	(1)	75	11	(1)	(1)	2	(1)	(1)	(1)
1889	(1)	170	17	143	7	2	11	4	(1)
1890	(1)	185	15	150	7	3	18	4	(1)
1897	51	215	14	55	6	5	19	50	415
1902	67	75	25	214	5	12	51	157	606
1908	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1918	(1)	5	(1)	588	12	14	54	1,873	(1)
1923	2	13	(1)	142	9	39	60	1,028	(1)
1927	11	3	(1)	154	10	95	182	1,432	(1)
1928	9	4	3	164	8	63	163	996	1,410
1929	1	(2)	(1)	84	24	14	266	951	(1)

[1] Statistics not available.
[2] Less than 500 pounds.
[3] Includes spots.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Drum, red or redfish								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1887	129	55	20	(1)	(1)	141	289	1,005	(1)
1888	140	51	21	(1)	(1)	165	288	944	(1)
1889	515	91	32	565	64	185	314	1,063	2,829
1890	219	88	39	629	54	201	339	1,108	2,677
1897	179	110	24	472	213	199	465	1,144	2,806
1902	144	102	35	1,219	70	93	442	898	3,003
1908	[4] 343	109	151	1,426	[4] 151	[4] 244	[4] 716	[4] 1,309	[4] 4,449
1918	[4] 100	1	2	1,327	23	116	566	1,337	3,472
1923	245	31	1	1,520	15	177	665	878	3,532
1927	99	7	1	939	55	237	556	1,248	3,142
1928	237	5	6	1,091	49	208	434	1,030	3,060
1929	195	11	4	1,208	105	129	445	934	3,031

Year	Flounders								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1887	(1)	(1)	(1)	(1)	(1)	45	18	116	(1)
1888	(1)	(1)	(1)	(1)	(1)	48	20	117	(1)
1889	48	(1)	(1)	(1)	20	70	21	121	(1)
1890	49	(1)	(1)	(1)	20	77	26	131	(1)
1897	174	(1)	6	(1)	47	28	10	218	(1)
1902	262	2	3	130	36	79	2	241	755
1908	403	5	7	185	31	38	71	140	880
1918	91	16	11	51	39	38	22	162	430
1923	333	28	(1)	77	2	88	22	118	(1)
1927	349	14	(1)	131	27	93	43	78	(1)
1928	455	21	16	146	34	67	13	52	804
1929	725	25	3	124	32	61	25	66	1,061

Year	Grouper							
	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	(1)	(1)	(1)	--------	--------	--------	--------	(1)
1887	(1)	(1)	(1)	(1)	--------	--------	4	(1)
1888	(1)	(1)	(1)	--------	--------	--------	7	(1)
1889	(1)	(1)	(1)	10	--------	18	--------	(1)
1890	(1)	(1)	(1)	11	--------	18	--------	(1)
1897	33	(1)	(1)	69	--------	(1)	3	(1)
1902	41	50	464	635	--------	(1)	40	(1)
1908	40	160	1,276	394	--------	(1)	(1)	(1)
1918	(1)	28	5,701	244	25	20	21	(1)
1923	8	11	4,283	305	26	10	33	4,676
1927	(1)	26	4,548	144	38	16	37	(1)
1928	(1)	8	4,118	199	49	(1)	22	(1)
1929	(1)	8	4,145	154	25	4	16	(1)

[1] Statistics not available.

[4] Includes some black drum.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	King whiting or "kingfish"								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1887	19	618	11	(1)	(1)	(1)	(1)	(1)	(1)
1888	20	601	10	23	(1)	(1)	(1)	(1)	(1)
1889	31	491	12	26	4	(1)	(1)	(1)	(1)
1890	35	524	18	39	4	(1)	(1)	(1)	(1)
1897	403	638	46	18	2	(1)	(1)	(1)	(1)
1902	120	606	57	102	25	53	(1)	42	(1)
1908	817	274	98	230	(1)	12	(1)	10	(1)
1918	(1)	40	27	332	10	19	(1)	36	(1)
1923	560	83	1	252	3	9	(1)	11	(1)
1927	487	60	3	281	4	2	(1)	19	(1)
1928	780	62	56	447	1	34	62	24	1,466
1929	387	101	51	665	2	32	42	29	1,309

Year	Menhaden				
	North Carolina	Georgia	Florida	Texas	Total
1887	14,756		(1)		(1)
1888	13,844		(1)		(1)
1889	8,753		8		8,761
1890	12,410				12,410
1897	11,310				11,310
1902	18,862		2		18,864
1908	57,412				57,412
1918	179,911	29,485	48,658	14,118	272,172
1923	63,290	26,973	68,874	8,517	167,654
1927	98,987	34,102	38,342		171,431
1928	99,302	30,030	27,369		156,701
1929	173,490	29,213	50,532		253,235

Year	Mullet								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	3,368	232	106	2,691	125	2	55	8	6,587
1887	2,461	400	47	(1)	(1)	233	253	31	(1)
1888	2,248	341	48	(1)	262	233	253	32	(1)
1889	4,252	464	57	14,564	613	722	283	82	21,037
1890	4,890	553	53	17,123	588	305	288	83	23,883
1897	4,716	61	56	18,024	600	241	166	(1)	(1)
1902	8,429	139	126	33,651	1,546	603	123	(1)	(1)
1908	6,013	708	194	24,718	1,656	1,035	133	(1)	(1)
1918	1,286	272	11	36,798	1,703	1,565	325	(1)	(1)
1923	1,933	532	4	34,652	648	1,739	181	(1)	(1)
1927	4,325	461	9	31,385	1,973	2,363	132	5	40,653
1928	2,502	291	57	30,016	2,118	803	24	14	35,825
1929	2,568	336	122	27,925	2,026	601	69	13	33,661

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[1] Statistics not available.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Shad				
	North Carolina	South Carolina	Georgia	Florida	Total
1880	3,221	208	252	252	3,933
1887	4,783	366	255	(1)	(1)
1888	5,725	433	263	1,448	7,869
1889	5,403	577	356	2,051	8,387
1890	5,815	563	400	2,654	9,432
1897	8,963	506	788	1,011	11,268
1902	6,567	434	1,029	1,819	9,849
1908	3,942	464	1,333	2,833	8,572
1918	1,657	167	101	964	2,889
1923	2,370	184	134	503	3,191
1927	2,387	182	187	348	3,104
1928	3,118	320	317	691	4,446
1929	1,913	260	472	701	3,346

Year	Sheepshead								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1887	202	101	8	(1)	(1)	124	362	695	(1)
1888	212	111	8	(1)	(1)	128	366	647	(1)
1889	187	39	5	791	33	156	364	739	2,314
1890	202	39	5	818	35	173	391	779	2,442
1897	271	36	25	1,053	87	110	238	468	2,288
1902	155	27	50	1,778	75	70	339	217	2,711
1908	249	20	64	1,571	24	81	249	298	2,556
1918	26	2	(1)	1,093	28	68	277	198	(1)
1923	52	1	(1)	1,057	21	91	193	141	(1)
1927	23	--------	(1)	734	47	144	183	48	(1)
1928	22	--------	1	575	38	80	108	55	879
1929	23	(2)	1	961	47	38	101	46	1,217

Year	Snapper, red								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	(1)	(1)	(1)	(1)	360	--------	900	--------	(1)
1887	(1)	1	(1)	(1)	(1)	--------	131	75	(1)
1888	(1)	1	3	3,224	86	--------	150	65	(1)
1889	(1)	(1)	(1)	(1)	51	--------	250	22	(1)
1890	(1)	18	(1)	(1)	62	--------	240	5	(1)
1897	[5] 34	54	(1)	(1)	335	--------	(1)	465	(1)
1902	(1)	10	125	8,094	3,466	--------	(1)	2,068	(1)
1908	[5] 13	12	880	7,719	2,635	--------	(1)	2,252	(1)
1918	(1)	(1)	112	7,250	798	98	60	1,243	(1)
1923	1	2	105	9,483	970	104	175	1,009	11,849
1927	1	(1)	64	9,372	1,059	219	72	1,237	(1)
1928	2	(1)	22	7,938	1,301	97	48	1,055	(1)
1929	15	(1)	33	7,719	1,227	91	80	804	(1)

[1] Statistics not available.

[2] Less than 500 pounds.

[5] Includes snappers other than red.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Spanish mackerel								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Tota
1887	(1)	(1)	(1)	(1)	(1)	30	119	11	(1)
1888	(1)	(1)	(1)	(1)	--------	34	126	11	(1)
1889	82	(1)	(1)	382	58	44	134	17	(1)
1890	100	(1)	(1)	448	44	46	144	25	(1)
1897	331	10	18	506	86	65	56	41	1, 113
1902	354	--------	--------	2, 172	34	7	6	64	(1)
1908	457	(1)	(1)	2, 647	13	7	5	42	(1)
1918	149	(1)	(1)	6, 525	4	12	2	41	(1)
1923	183	(1)	(1)	6, 241	1	10	3	79	(1)
1927	200	(1)	(1)	6, 491	22	12	23	144	(1)
1928	176	(1)	(1)	5, 303	4	9	22	88	(1)
1929	142	(1)	(1)	5, 965	10	2	9	87	(1)

Year	Spot							
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Total
1880	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1887	[6] 88	[6] 52	[6] 11	(1)	(1)	75	54	(1)
1888	[6] 90	[6] 57	[6] 10	[6] 28	(1)	[6] 79	[6] 55	(1)
1889	441	[6] 46	[6] 14	51	25	45	30	652
1890	499	[6] 42	[6] 14	59	25	46	31	716
1897	917	[6] 49	(1)	[6] 49	[6] 504	[6] 52	[6] 329	(1)
1902	977	22	(1)	47	64	78	(1)	(1)
1908	852	66	(1)	178	83	71	(1)	(1)
1918	1, 258	75	1	431	42	19	67	1, 893
1923	1, 790	132	1	128	16	27	23	2, 117
1927	1, 959	216	1	560	32	24	59	2, 851
1928	2, 954	90	8	336	11	26	35	3, 460
1929	3, 310	38	12	276	7	29	41	3, 713

Year	Squeteagues or "sea trout"								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	1, 120	470	122	(1)	(1)	(1)	(1)	(1)	(1)
1887	909	217	67	(1)	(1)	258	524	941	(1)
1888	946	207	67	(1)	228	280	522	872	(1)
1889	1, 971	116	130	955	205	370	619	1, 077	5, 443
1890	2, 131	103	144	889	209	372	656	1, 120	5, 624
1897	3, 174	80	55	1, 346	296	453	567	1, 012	6, 983
1902	3, 984	86	83	2, 812	259	473	1, 078	1, 119	9, 894
1908	4, 648	183	140	4, 864	208	517	1, 103	1, 055	12, 718
1918	3, 361	59	40	3, 339	139	356	1, 190	1, 613	10, 097
1923	3, 984	70	5	2, 789	49	410	783	1, 524	9, 614
1927	4, 534	54	18	3, 452	118	605	822	1, 700	11, 303
1928	5, 127	20	18	3, 921	125	487	885	1, 160	11, 743
1929	5, 090	68	38	3, 931	128	384	513	1, 178	11, 330

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[1] Statistics not available.

[6] Includes croakers.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES: BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Crabs								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	11	42	7	(1)	(1)	(1)	288	36	(1)
1887	47	76	45	(1)	(1)	53	971	111	(1)
1888	47	69	44	(1)	96	57	994	115	(1)
1889	50	86	43	3	(1)	67	989	189	(1)
1890	47	93	48	4	(1)	47	981	191	(1)
1897	1, 027	110	75	10	24	153	1, 459	138	2, 996
1902	203	96	80	19	75	265	1, 312	43	2, 093
1908	390	33	196	210	246	427	322	200	2, 024
1918	379	18	8	76	96	225	282	194	1, 278
1923	514	9	120	79	84	443	316	109	1, 674
1927	1, 225	10	59	198	32	2, 424	1, 227	121	5, 306
1928	1, 476	2	569	253	105	1, 584	2, 503	301	6, 793
1929	1, 206	60	225	350	107	1, 259	2, 755	163	6, 125

Year	Shrimp								
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
1880	63	630	56	72	(1)	(1)	534	638	(1)
1887	120	338	185	(1)	(1)	1, 145	6, 810	255	(1)
1888	124	359	191	(1)	44	1, 093	6, 943	259	(1)
1889	135	380	150	78	30	794	7, 238	242	9, 047
1890	144	372	162	66	(1)	614	6, 662	176	(1)
1897	146	374	68	39	41	1, 903	4, 487	361	7, 419
1902	84	370	344	3, 030	(1)	4, 424	7, 635	291	(1)
1908	371	452	528	4, 354	37	4, 121	8, 581	118	18, 562
1918	940	55	5, 793	12, 118	1, 266	9, 147	18, 520	164	48, 003
1923	1, 658	355	10, 668	13, 905	3, 182	9, 879	27, 753	3, 422	70, 822
1927	1, 276	1, 657	12, 280	17, 168	5, 162	9, 234	40, 259	11, 832	98, 868
1928	845	431	9, 526	25, 384	5, 972	11, 768	53, 779	7, 774	115, 479
1929	897	288	12, 378	18, 619	4, 396	13, 102	49, 456	9, 415	108, 551

Year	Clams, hard				
	North Carolina	South Carolina	Georgia	Florida	Total
1880	310	48	24	(1)	(1)
1887	78	------------	(1)	(1)	(1)
1888	148	(1)	(1)	2	(1)
1889	155	(1)	3	12	(1)
1890	226	(1)	4	13	(1)
1897	938	185	3	12	1, 138
1902	1, 175	225	10	6	1, 416
1908	726	76	43	239	1, 084
1918	198	1	(1)	163	(1)
1923	264	86	(1)	607	(1)
1927	315	47	1	964	1, 327
1928	324	26	1	777	1, 128
1929	380	20	2	746	1, 148

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[1] Statistics not available.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

Fisheries of the South Atlantic and Gulf States, 1880 to 1929—Continued

CATCH OF CERTAIN SPECIES; BY STATES—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Oysters[7]									Sponges
	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total	Florida
1880	1, 190	350	490	550	732	175	2, 065	669	6, 221	207
1887	1, 491	264	771	(1)	(1)	4, 068	4, 748	1, 793	(1)	(1)
1888	1, 433	282	844	1, 674	533	5, 370	5, 040	2, 389	17, 565	254
1889	7, 011	305	1, 142	2, 500	3, 069	5, 919	5, 849	2, 524	28, 319	317
1890	5, 651	442	1, 570	3, 279	3, 367	5, 645	5, 891	3, 086	28, 931	367
1897	6, 012	1, 504	3, 406	1, 621	1, 785	4, 408	6, 714	2, 491	27, 941	333
1902	7, 160	4, 828	8, 568	6, 220	2, 432	16, 836	8, 389	2, 402	56, 835	347
1908	5, 690	10, 941	10, 214	7, 468	4, 132	7, 473	25, 554	3, 480	74, 952	545
1910	2, 326	4, 971	3, 536	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1911	(1)	(1)	(1)	(1)	3, 093	4, 604	31, 530	3, 043	(1)	(1)
1918	1, 519	2, 784	1, 110	3, 075	1, 032	8, 907	7, 855	3, 344	29, 626	452
1923	3, 917	5, 032	1, 720	2, 142	2, 262	11, 875	7, 155	2, 520	36, 623	575
1927	3, 468	5, 440	757	2, 518	1, 165	18, 815	11, 534	2, 763	46, 460	600
1928	3, 063	5, 798	1, 048	3, 538	4, 218	15, 210	10, 849	1, 807	45, 531	554
1929	4, 110	4, 608	551	3, 062	400	18, 674	7, 900	2, 501	41, 806	529

[1] Statistics not available.

[7] Shown on the basis of 7 pounds of meat to the bushel.

NOTE.—Prior to 1889 some of the above species were often included under the heading "Miscellaneous fish" or "All other fish"; therefore, the total for certain species is not shown for certain years of this period.

FISHERIES OF THE PACIFIC COAST STATES[4]

During 1929 the value of the catch of fishery products in the Pacific Coast States (Washington, Oregon, and California) exceeded that in any year for which there are records. This was due mainly to the increased production of salmon and pilchard, or sardine. These fisheries gave employment to 19,992 fishermen, or 1 per cent more than in 1928. Of the total number of fishermen employed during 1929, 5,822 were engaged on vessels and 14,170 were employed in the shore and boat fisheries. Their catch amounted to 1,034,433,666 pounds, valued at $25,038,414. This is an increase of 47 per cent in the catch and 22 per cent in the value of the catch as compared with the quantity and its value for 1928. Of the total catch in 1929, 1,012,728,784 pounds, valued at $23,097,280, were fish; 16,166,888 pounds, valued at $1,572,437, were shellfish and miscellaneous products; and 5,537,994 pounds, valued at $368,697, were whale products.

Based on the value to the fishermen, salmon with a production of 141,892,471 pounds, valued at $9,607,043, was by far the most important fishery product taken on the Pacific coast. Pilchard, or sardine, ranked second with a production of 651,802,019 pounds, valued at $3,587,765. Other important species were yellowfin tuna, 37,398,661 pounds, valued at $2,200,366; halibut, 10,419,779 pounds, valued at $1,471,541; and skipjack or striped tuna, 26,997,611 pounds, valued at $1,080,771. Other products were valued individually at less than $1,000,000.

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[4] Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State fisheries agencies. Supplementary surveys, compilations, and analyses have been made by agents of this bureau in order that the figures may be presented in a manner comparable with those of other sections.

The industries related to the fisheries of the Pacific Coast States gave employment to 11,987 persons, of whom 310 were engaged in transporting fishery products, 1,373 were in the wholesale industry and received $2,300,500 in salaries and wages, and 10,304 were in the manufacturing industry and received $6,859,656 in salaries and wages. There were 120 establishments in the wholesale industry handling primary products and 169 establishments were in the manufacturing industry. The latter manufactured products, valued at $50,498,558, consisting principally of canned salmon, tuna and tunalike fishes, and sardines.

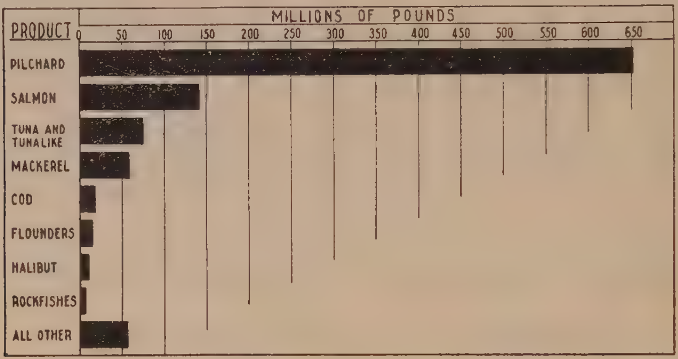

FIGURE 20.—Yield of principal fishery products in the Pacific Coast States, 1929

SUMMARY OF CATCH

Products	Washington		Oregon	
	Pounds	*Value*	*Pounds*	*Value*
Fish	148, 765, 095	$8, 833, 932	24, 366, 685	$2, 521, 139
Shellfish, etc	3, 458, 848	728, 845	916, 964	84, 014
Total	152, 223, 943	9, 562, 777	25, 283, 649	2, 605, 153

Products	California		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	839, 597, 004	$11, 742, 209	1, 012, 728, 784	$23, 097, 280
Shellfish, etc	11, 791, 076	759, 578	16, 166, 888	1, 572, 437
Whale products	5, 537, 994	368, 697	5, 537, 994	368, 697
Total	856, 926, 074	12, 870, 484	1, 034, 433, 666	25, 038, 414

Fisheries of the Pacific Coast States, 1929

OPERATING UNITS: BY STATES

Items	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2,291	2	19	2,312	84	34	118
On boats and shore	2,011	2,871	1,833	6,715	2,685	1,390	4,075
Total	4,302	2,873	1,852	9,027	2,769	1,424	4,193
Vessels:							
Steam	2	-----	-----	2	-----	-----	-----
Net tonnage	16	-----	-----	16	-----	-----	-----
Motor	294	1	8	303	32	12	44
Net tonnage	6,006	8	81	6,095	295	127	422
Sail	7	-----	-----	7	-----	-----	-----
Net tonnage	2,516	-----	-----	2,516	-----	-----	-----
Total vessels	303	1	8	312	32	12	44
Total net tonnage	8,538	8	81	8,627	295	127	422
Boats:							
Motor	1,050	280	989	2,319	1,397	717	2,114
Other	382	289	258	929	78	292	370
Apparatus:							
Purse seines—Salmon	211	-----	-----	211	-----	-----	-----
Length, yards	130,820	-----	-----	130,820	-----	-----	-----
Haul seines	126	-----	51	177	45	3	48
Length, yards	11,883	-----	14,302	26,185	25,600	453	26,053
Gill nets—							
Drift: Salmon	366	129	539	1,034	978	513	1,491
Square yards	631,744	286,260	1,273,757	2,191,761	3,066,470	540,736	3,607,206
Set: Salmon	23	253	297	573	217	1,156	1,373
Square yards	8,432	107,019	72,400	187,851	60,408	186,516	246,924
Lines—							
Trawl, set and hand	25,963	24	49	26,036	332	125	457
Hooks	531,279	2,400	4,900	538,579	36,500	17,050	53,550
Troll	1,935	35	688	2,658	1,224	526	1,750
Hooks	8,706	105	3,092	11,903	5,358	2,362	7,720
Pound nets	143	166	345	654	67	-----	67
Brush weirs	3	-----	-----	3	-----	-----	-----
Fish wheels	-----	-----	34	34	-----	-----	-----
Dip nets	3	-----	166	169	180	-----	180
Drag bag nets	64	-----	-----	64	-----	-----	-----
Length, yards	5,325	-----	-----	5,325	-----	-----	-----
Reef nets	7	-----	-----	7	-----	-----	-----
Beam trawls	29	-----	-----	29	-----	-----	-----
Yards at mouth	193	-----	-----	193	-----	-----	-----
Traps—							
Crab	2,350	3,640	-----	5,990	-----	2,232	2,232
Crawfish	-----	-----	-----	-----	840	-----	840
Tongs and rakes	180	15	-----	195	-----	2	2
Shovels	247	2,485	-----	2,732	-----	212	212
Spears	-----	15	-----	15	-----	-----	-----

Items	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	37	296	369	1,984	706	3,392	5,822
On boats and shore	495	967	828	818	272	3,380	14,170
Total	532	1,263	1,197	2,802	978	6,772	19,992
Vessels:							
Steam	-----	5	-----	-----	-----	5	7
Net tonnage	-----	267	-----	-----	-----	267	283
Motor	13	29	36	249	109	436	783
Net tonnage	148	361	526	6,335	3,800	11,170	17,687
Sail	-----	2	-----	-----	-----	2	9
Net tonnage	-----	876	-----	-----	-----	876	3,392
Total vessels	13	36	36	249	109	443	799
Total net tonnage	148	1,504	526	6,335	3,800	12,313	21,362

Fisheries of the Pacific Coast States, 1929—Continued

OPERATING UNITS: BY STATES—Continued

Items	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	185	581	265	424	145	1,600	6,033
Other	191	61	20	35	20	327	1,626
Apparatus:							
Purse seines—							
Barracuda	----------	----------	----------	36	----------	36	36
Length, yards	----------	----------	----------	15,696	----------	15,696	15,696
Salmon	----------	----------	----------	----------	----------	----------	211
Length, yards	----------	----------	----------	----------	----------	----------	130,820
Sardines	----------	----------	7	80	----------	87	87
Length, yards	----------	----------	2,940	32,906	----------	35,846	35,846
Tuna	----------	----------	----------	60	----------	60	60
Length, yards	----------	----------	----------	34,638	----------	34,638	34,638
Lampara nets—							
Sardine	----------	21	64	92	30	207	207
Length, yards	----------	3,600	20,977	37,160	7,860	69,597	69,597
Squid	----------	----------	49	----------	----------	49	49
Length, yards	----------	----------	10,914	----------	----------	10,914	10,914
Haul seines	10	----------	----------	----------	----------	10	235
Length, yards	1,550	----------	----------	----------	----------	1,550	53,788
Gill nets—							
Drift:							
Salmon	153	185	----------	----------	----------	338	2,863
Square yards	139,721	567,580	----------	----------	----------	707,301	6,506,268
Shad	----------	184	----------	----------	----------	184	184
Square yards	----------	630,752	----------	----------	----------	630,752	630,752
Striped bass	----------	128	----------	----------	----------	128	128
Square yards	----------	319,488	----------	----------	----------	319,488	319,488
Sea bass	----------	23	32	----------	----------	55	55
Square yards	----------	38,640	64,345	----------	----------	102,985	102,985
Set:							
Salmon	----------	----------	----------	----------	----------	----------	1,946
Square yards	----------	----------	----------	----------	----------	----------	434,775
Sea bass	----------	----------	----------	25	24	49	49
Square yards	----------	----------	----------	136,558	115,900	252,458	252,458
Other:							
Barracuda	----------	----------	----------	45	24	69	69
Square yards	----------	----------	----------	388,249	234,452	622,701	622,701
Miscellaneous	6	61	65	14	15	161	161
Square yards	2,558	63,288	122,150	7,560	18,225	213,781	213,781
Trammel nets	----------	----------	----------	36	18	54	54
Square yards	----------	----------	----------	242,180	242,798	484,978	484,978
Lines—							
Trawl, set and hand	471	381	1,067	1,287	649	3,855	30,348
Hooks	74,688	47,622	149,408	250,086	105,206	627,010	1,219,139
Troll	804	965	505	2,345	1,608	6,227	10,635
Hooks	3,748	4,704	3,132	2,345	1,608	15,537	35,160
Pound nets	----------	----------	----------	----------	----------	----------	721
Brush weirs	----------	----------	----------	----------	----------	----------	3
Fish wheels	----------	----------	----------	----------	----------	----------	34
Fyke nets	----------	1,920	----------	----------	----------	1,920	1,920
Dip nets	53	----------	----------	----------	----------	53	402
Bag nets, shrimp	----------	12	----------	----------	----------	12	12
Length, yards	----------	6,272	----------	----------	----------	6,272	6,272
Drag bag nets	----------	----------	----------	----------	----------	----------	64
Length, yards	----------	----------	----------	----------	----------	----------	5,325
Reef nets	----------	----------	----------	----------	----------	----------	7
Paranzella nets	2	10	1	6	----------	19	19
Yards at mouth	33	167	17	100	----------	317	317
Beam trawls	1	25	----------	----------	----------	26	55
Yards at mouth	7	167	----------	----------	----------	174	367
Traps—							
Crab	315	3,772	30	----------	----------	4,117	12,339
Crawfish	----------	----------	----------	----------	----------	----------	840
Lobster	----------	----------	----------	2,349	1,423	3,772	3,772
Octopus	12	----------	47	----------	----------	59	59
Harpoons—							
Whale	----------	4	----------	----------	----------	4	4
Swordfish and turtles	----------	----------	----------	17	30	47	47
Tong and rakes	3	13	5	----------	----------	21	218
Shovels	5	20	11	69	1	106	3,050
Abalone outfits	6	----------	13	3	----------	22	22
Spears	----------	----------	----------	----------	----------	----------	15

Fisheries of the Pacific Coast States, 1929—Continued

CATCH: BY STATES

Species	Washington		Oregon	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Anchovies			3, 395	$34
Carp	387, 068	$11, 612		
Cod [2]	13, 531, 973	268, 341		
Flounders:				
"Sole"	330, 995	16, 211	24, 586	957
Other	105, 286	2, 161	8, 835	353
Grayfish	286, 419	1, 060		
Hake			250	3
Halibut	9, 153, 674	1, 313, 312	515, 579	69, 806
Herring	764, 068	4, 602	151, 200	2, 297
"Lingcod"	1, 058, 639	36, 367	264, 184	8, 083
Perch	67, 505	3, 439	94, 331	2, 290
Pilchard or sardine			30, 115	301
Rockfishes	514, 071	21, 443	128, 205	5, 523
Sablefish	2, 074, 603	127, 128	151, 791	7, 074
Salmon	116, 745, 076	6, 802, 015	20, 102, 524	2, 245, 561
Shad	490, 607	9, 812	1, 185, 652	23, 712
Skates	365	8		
Smelt	1, 485, 679	47, 766	50, 061	1, 366
Steelhead trout	1, 658, 107	154, 957	1, 547, 514	145, 839
Striped bass			11, 619	1, 404
Sturgeon	95, 239	13, 068	96, 573	6, 523
Tomcod	4, 967	198	235	9
Tuna and tunalike fishes: Albacore			36	4
Other fish	10, 754	432		
Total	148, 765, 095	8, 833, 932	24, 366, 685	2, 521, 139
SHELLFISH, ETC.				
Crabs	1, 319, 270	93, 336	705, 364	50, 113
Crawfish			146, 000	18, 250
Shrimp	49, 563	4, 961		
Clams:				
Hard	193, 036	28, 985		
Razor	1, 058, 516	191, 121	47, 213	8, 525
Soft			9, 387	1, 126
Octopus	88, 051	4, 398		
Oysters:				
Eastern, market	8, 780	5, 698		
Japanese, market	65, 796	23, 326		
Native, market	608, 964	356, 443	9, 000	6, 000
Scallops	66, 872	20, 577		
Total	3, 458, 848	728, 845	916, 964	84, 014
Grand total	152, 223, 943	9, 562, 777	25, 283, 649	2, 605, 153

Species	California [1]		Total	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Anchovies	382, 445	$4, 467	385, 840	$4, 501
Barracuda	5, 228, 610	530, 080	5, 228, 610	530, 080
Carp	84, 937	2, 338	472, 005	13, 950
Catfish	506, 159	73, 090	506, 159	73, 090
Cod [2]	4, 915, 151	82, 510	18, 447, 124	350, 851
Eels	327	7	327	7
Flounders:				
"California halibut"	1, 102, 573	154, 432	1, 102, 573	154, 432
"Sole"	11, 706, 455	527, 485	12, 062, 036	544, 653
Other	1, 633, 943	81, 305	1, 748, 064	83, 819
Grayfish	833, 985	10, 530	1, 120, 404	11, 590
Hake	145, 669	2, 771	145, 919	2, 774
Halibut	750, 526	88, 423	10, 419, 779	1, 471, 541
Hardhead	55, 410	7, 868	55, 410	7, 868
Herring	957, 563	9, 766	1, 872, 831	16, 665
Horse mackerel	708, 791	19, 433	708, 791	19, 433
Kingfish	476, 497	13, 439	476, 497	13, 439
"Lingcod"	1, 164, 163	48, 128	2, 486, 986	92, 578
Mackerel	57, 975, 357	878, 538	57, 975, 357	878, 538
Mullet	64, 594	5, 514	64, 594	5, 514
Perch	311, 194	17, 631	473, 030	23, 360
Pilchard or sardine	651, 771, 904	3, 587, 464	651, 802, 019	3, 587, 765
Pompano	25, 438	4, 226	25, 438	4, 226
Rock bass	482, 536	34, 713	482, 536	34, 713
Rockfishes	6, 034, 778	307, 405	6, 677, 054	334, 371

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[1] Taken off Pacific coast, including Latin America.

[2] The cod were taken off Alaska.

Fisheries of the Pacific Coast States, 1929—Continued

CATCH: BY STATES—Continued

Species	California		Total	
	Pounds	*Value*	*Pounds*	*Value*
Sablefish	1, 439, 408	55, 065	3, 665, 802	189, 267
Salmon	5, 044, 871	559, 467	141, 892, 471	9, 607, 043
Sculpin	108, 993	11, 212	108, 993	11, 212
Sea bass:				
Black	404, 211	22, 821	404, 211	22, 821
White or squeteague	1, 562, 232	193, 072	1, 562, 232	193, 072
Shad	1, 602, 970	51, 597	3, 279, 229	85, 121
Sheepshead	288, 422	13, 631	288, 422	13, 631
Skates	427, 986	8, 463	428, 351	8, 471
Smelt	914, 001	57, 413	2, 449, 741	106, 545
Splittail	8, 738	461	8, 738	461
Squawfish	3, 264	131	3, 264	131
Steelhead trout			3, 205, 621	300, 796
Striped bass	528, 981	79, 185	540, 600	80, 589
Sturgeon			191, 812	19, 591
Suckers	842	33	842	33
Swordfish	693, 081	89, 141	693, 081	89, 141
Tomcod	15, 884	635	21, 086	842
Tuna and tunalike fishes:				
Albacore	269, 101	40, 366	269, 137	40, 370
Bluefin	7, 526, 857	489, 962	7, 526, 857	489, 962
Bonito	2, 918, 544	98, 128	2, 918, 544	98, 128
Skipjack or striped tuna	26, 997, 611	1, 080, 771	26, 997, 611	1, 080, 771
Yellowfin	37, 398, 661	2, 200, 366	37, 398, 661	2, 200, 366
Whitebait	243, 119	15, 769	243, 119	15, 769
Whitefish	201, 725	11, 853	201, 725	11, 853
Yellowtail	3, 075, 264	149, 948	3, 075, 264	149, 948
Other fish	603, 233	21, 156	613, 987	21, 588
Total	839, 597, 004	11, 742, 209	1, 012, 728, 784	23, 097, 280
SHELLFISH, ETC.				
Crabs	1, 792, 776	163, 462	3, 817, 410	306, 911
Crawfish			146, 000	18, 250
Sea crawfish or spiny lobster	1, 391, 682	273, 990	1, 391, 682	273, 990
Shrimp	3, 054, 748	45, 822	3, 104, 311	50, 783
Abalone	693, 729	139, 359	693, 729	139, 359
Clams:				
Cockle	8, 728	4, 348	8, 728	4, 348
Hard			193, 036	28, 985
Pismo	27, 436	10, 264	27, 436	10, 264
Razor			1, 105, 729	199, 646
Soft	16, 918	9, 376	26, 305	10, 502
Mixed	2, 025	881	2, 025	881
Mussels	103	36	103	36
Octopus	87, 123	8, 995	175, 174	13, 393
Oysters:				
Eastern, market	43, 725	21, 862	52, 505	27, 560
Japanese, market			65, 796	23, 326
Native, market	9, 295	4, 647	627, 259	367, 090
Scallops			66, 872	20, 577
Squid	4, 660, 572	76, 357	4, 660, 572	76, 357
Turtles	2, 216	179	2, 216	179
Total	11, 791, 076	759, 578	16, 166, 888	1, 572, 437
WHALE PRODUCTS				
Whale oil	5, 329, 994	365, 111	5, 329, 994	365, 111
Other products	208, 000	3, 586	208, 000	3, 586
Total	5, 537, 994	368, 697	5, 537, 994	368, 697
Grand total	856, 926, 074	12, 870, 484	1, 034, 433, 666	25, 038, 414

Industries related to the fisheries of the Pacific Coast States, 1929

Items	Washington	Oregon	California	Total
	Number	*Number*	*Number*	*Number*
Transporting:				
Persons engaged	204	50	56	310
Vessels—				
Steam			1	1
Net tonnage			32	32
Motor	84	28	7	119
Net tonnage	1,607	301	475	2,383
Sail			5	5
Net tonnage			1,818	1,818
Total vessels	84	28	13	125
Total net tonnage	1,607	301	2,325	4,233
Wholesale:				
Establishments	39	20	61	120
Persons engaged	443	118	812	1,373
Salaries and wages paid	$729,683	$127,679	$1,443,138	$2,300,500
Manufacturing:				
Establishments	76	29	64	169
Persons engaged	2,456	872	6,976	10,304
Salaries and wages paid	$1,425,897	$763,516	$4,670,243	$6,859,656
Products	$13,858,998	$5,658,861	$30,980,699	$50,498,558

WASHINGTON

In 1929 Washington ranked second among the Pacific Coast States in the importance of its fisheries, employing 45 per cent of the total number of fishermen and accounting for 15 per cent of the total catch. There were 9,027 fishermen employed, which is 3 per cent more than in 1928. Of the total number of fishermen, 2,312 were employed on fishing vessels and 6,715 in the shore and boat fisheries.

The catch amounted to 152,223,943 pounds, valued at $9,562,777. This is an increase of 84 per cent in the catch and 28 per cent in the value of the catch as compared with the catch and its value for 1928. Of the total value of the catch, salmon accounted for 71 per cent; halibut, 14 per cent; oysters, 4 per cent; and cod, 3 per cent. Of the total catch, salmon accounted for 77 per cent; cod, 9 per cent; halibut, 6 per cent; and sablefish, steelhead trout, smelt, crabs, clams, and "lingcod," each, 1 per cent.

Operating units.—The catch of the fishery products from the Puget Sound, coastal, and Columbia River districts of Washington was taken by 9,027 fishermen, 2 steam vessels, 303 motor vessels, 7 sailing vessels, 3,248 motor and other small boats, and 15 major types of gear. The vessels had a combined net tonnage of 8,627 net tons.

Fisheries of Washington, 1929

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					387,068	$11,612
Cod	13,531,973	$268,341				
Flounders:						
"Sole"	330,995	16,211				
Other	105,286	2,161				
Grayfish	286,419	1,060				
Halibut	9,136,168	1,310,983	2,071	$173	15,435	2,156
Herring	764,068	4,602				
"Lingcod"	1,010,898	35,889	47,741	478		
Perch	64,255	3,277	3,250	162		
Rockfishes	500,921	21,312	13,150	131		
Sablefish	2,074,603	127,128				

Fisheries of Washington, 1929—Continued

CATCH: BY DISTRICTS—Continued

Species	Puget Sound district		Coastal district		Columbia River dis- district	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued						
Salmon:						
Blueback, red or sockeye	9,448,768	$1,301,442	479,166	$55,903	346,989	$62,798
Chinook or king	11,520,552	1,334,216	1,062,470	100,636	6,375,497	837,338
Chum or keta	14,866,350	419,519	4,575,654	76,261	1,057,734	26,442
Humpback or pink	51,450,596	1,523,627				
Silver or coho	12,544,535	825,027	942,652	56,922	2,074,113	181,884
Shad					490,607	9,812
Skates	365	8				
Smelt	203,685	28,536			1,281,994	19,230
Steelhead trout	102,654	14,680	43,220	4,175	1,512,233	136,102
Sturgeon	1,368	216	27,408	2,193	66,463	10,659
Tomcod	4,967	198				
Other fish	10,754	432				
Total	127,960,180	7,238,865	7,196,782	297,034	13,608,133	1,298,033
SHELLFISH						
Crabs	525,720	23,900	793,550	69,436		
Shrimp	49,563	4,961				
Clams:						
Hard	193,036	28,985				
Razor			1,058,516	191,121		
Octopus	88,051	4,398				
Oysters:						
Eastern, market			8,780	5,698		
Japanese, market	63,140	22,584	2,656	742		
Native, market	570,516	338,352	38,448	18,091		
Scallops	66,872	20,577				
Total	1,556,898	443,757	1,901,950	285,088		
Grand total	129,517,078	7,682,622	9,098,732	582,122	13,608,133	1,298,033

PUGET SOUND DISTRICT

The Puget Sound district is comprised of Whatcom, Skagit, Snohomish, King, Pierce, Thurston, Mason, Kitsap, Island, and San Juan Counties and parts of Jefferson and Clallam Counties. The catch in this district in 1929 amounted to 129,517,078 pounds, valued at $7,682,622. Of the more important species comprising this catch, salmon amounted to 99,830,801 pounds, valued at $5,403,831; halibut, 9,136,168 pounds, valued at $1,310,983; oysters, 633,656 pounds, valued at $360,936; cod, 13,531,973 pounds, valued at $268,341; and sablefish, 2,074,603 pounds, valued at $127,128.

Operating units.—The catch of fishery products in the Puget Sound district was taken by 4,302 fishermen who used 2 steam vessels, 294 motor vessels, 7 sailing vessels, 1,432 motor and other small boats, and 13 major types of gear. The vessels had a combined capacity of 8,538 net tons.

Catch by gear.—Three types of gear accounted for 95 per cent of the fishery products taken in the Puget Sound district during 1929. Listed in the order of their importance they were: Purse seines, which accounted for 44 per cent of the catch; lines, 26 per cent; and pound nets, 25 per cent. The catch by purse seines and pound nets was almost entirely salmon; and that by lines was principally cod, halibut, salmon, and sablefish.

Fisheries of the Puget Sound district of Washington, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines, salmon	Haul seines	Gill nets		Lines		Pound nets	Brush weirs
			Drift, salmon	Set, salmon	Trawl, set, and hand	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1, 732	79	4		773	98		
On boats and shore	20	244	419	17	80	537	215	6
Total	1, 752	323	423	17	853	835	215	6
Vessels:								
Motor	207	16	2		98	49		
Net tonnage	4, 681	364	12		1, 970	349		
Sail					7			
Net tonnage					2, 516			
Total vessels	207	16	2		105	49		
Total net tonnage	4, 681	364	12		4, 486	349		
Boats:								
Motor	4	90	358		21	402	108	
Other		88	6	17	57		66	
Apparatus:								
Number	211	126	366	23	25, 963	1, 935	143	3
Length, yards	130, 820	11, 883						
Square yards			631, 744	8, 432				
Hooks					531, 279	8, 706		

Items	Dip nets	Drag bag nets	Reef nets	Beam trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		14		39	15			2, 291
On boats and shore	3	124	7	26	114	90	247	2, 011
Total	3	138	7	65	129	90	247	4, 302
Vessels:								
Steam				2				2
Net tonnage				16				16
Motor		4		14	5			294
Net tonnage		91		156	100			6, 006
Sail								7
Net tonnage								2, 516
Total vessels		4		16	5			303
Total net tonnage		91		172	100			8, 538
Boats:								
Motor		55	4	13	105	19		1, 050
Other	3	5	4			149		382
Apparatus:								
Number	3	64	7	29	2, 350	180	247	
Length, yards		5, 325						
Yards at mouth				193				

Fisheries of the Puget Sound district of Washington, 1929—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Set	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Flounders:								
"Sole"	---------	---------	7,742	$379	---------	---------	583	$29
Other	---------	---------	11,867	237	1,545	$31	4,988	100
Grayfish	---------	---------	---------	---------	---------	---------	17,200	64
Herring	---------	---------	372,668	2,236	---------	---------	---------	---------
"Lingcod"	---------	---------	2,875	101	---------	---------	7,116	249
Perch	---------	---------	52,613	2,683	100	6	1,638	84
Rockfishes	184	$8	8,857	399	31	1	3,576	161
Salmon:								
Blueback, red or sockeye	3,292,023	423,761	129,759	16,683	48,090	6,870	---------	---------
Chinook or king	442,794	31,894	48,884	3,333	978,670	119,887	---------	---------
Chum or keta	12,916,510	322,919	35,270	885	627,570	31,378	1,100	44
Humpback or pink	34,825,690	966,118	469,123	12,983	211,352	7,799	---------	---------
Silver or coho	6,015,537	343,062	44,120	2,758	494,056	49,406	10,224	1,022
Skates	---------	---------	280	6	---------	---------	85	2
Smelt	---------	---------	92,708	12,979	---------	---------	---------	---------
Steelhead, trout	1,809	259	63	9	23,886	3,416	---------	---------
Sturgeon	---------	---------	80	3	---------	---------	---------	---------
Tomcod	---------	---------	---------	---------	---------	---------	926	37
Other fish	---------	---------	9	2	---------	---------	925	37
Total	57,494,547	2,088,021	1,276,918	55,676	2,385,300	218,794	48,361	1,829
SHELLFISH								
Octopus	---------	---------	665	33	---------	---------	988	49
Grand total	57,494,547	2,088,021	1,277,583	55,709	2,385,300	218,794	49,349	1,878

Species	Lines				Pound nets		Bush weirs	
	Trawl, set, and hand		Troll					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Cod	13,531,973	$268,341	---------	---------	---------	---------	---------	---------
Flounders:								
"Sole"	---------	---------	20	$1	---------	---------	---------	---------
Other	100	2	---------	---------	3,002	$60	---------	---------
Grayfish	12,019	44	---------	---------	---------	---------	18,000	$67
Halibut	9,123,761	1,309,814	11,939	1,089	428	73	---------	---------
Herring	---------	---------	400	20	500	3	363,400	2
"Lingcod"	911,576	33,901	64,991	786	3,217	113	---------	---------
Perch	1,351	68	---------	---------	---------	---------	---------	---------
Rockfishes	465,047	19,792	3,006	51	11,385	512	---------	---------
Sablefish	2,074,603	127,128	---------	---------	---------	---------	---------	---------
Salmon:								
Blueback, red or sockeye	---------	---------	---------	---------	5,962,782	851,826	---------	---------
Chinook or king	---------	---------	4,563,668	520,718	5,485,766	658,292	---------	---------
Chum or keta	---------	---------	220	9	1,282,140	64,107	---------	---------
Humpback or pink	---------	---------	11,675	447	15,795,652	531,221	---------	---------
Silver or coho	---------	---------	2,786,854	188,880	3,179,048	238,429	---------	---------
Steelhead, trout	---------	---------	---------	---------	76,896	10,996	---------	---------
Sturgeon	---------	---------	---------	---------	1,288	213	---------	---------
Tomcod	3,056	122	---------	---------	---------	---------	---------	---------
Other fish	---------	---------	---------	---------	2,343	94	---------	---------
Total	26,123,486	1,759,212	7,442,773	712,001	31,804,447	2,355,939	381,400	2,247
SHELLFISH								
Octopus	82,232	4,112	---------	---------	235	8	---------	---------
Grand total	26,205,718	1,763,324	7,442,773	712,001	31,804,682	2,355,947	381,400	2,247

Fisheries of the Puget Sound district of Washington, 1929—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Drag bag nets		Reef nets		Beam trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Flounders:								
"Sole"			3, 425	$160			319, 225	$15, 642
Other			829	17			82, 955	1, 714
Grayfish							239, 200	885
Halibut							40	7
Herring			27, 100	163				
'Lingcod"			354	12			20, 769	727
Perch			8, 271	422			282	14
Rockfishes			195	9			8, 640	379
Salmon:								
Blueback, red or sockeye					16, 114	$2, 302		
Chinook or king					770	92		
Chum or keta					3, 540	177		
Humpback or pink					137, 104	5, 059		
Silver or coho					14, 696	1, 470		
Smelt	1, 551	$237	109, 426	15, 320				
Tomcod							985	39
Other fish			260	10			7, 217	289
Total	1, 551	237	149, 860	16, 113	172, 224	9, 100	679, 313	19, 696
SHELLFISH								
Crabs							785	39
Shrimp	50	5					49, 513	4, 956
Octopus			50	2			3, 881	194
Scallops							66, 872	20, 577
Total	50	5	50	2			121, 051	25, 766
Grand total	1, 601	242	149, 910	16, 115	172, 224	9, 100	800, 364	45, 462

Species	Traps		Tongs and rakes		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	524, 935	$23, 861				
Clams, hard					193, 036	$28, 985
Oysters:						
Japanese, market			63, 140	$22, 584		
Native, market			570, 516	338, 352		
Grand total	524, 935	23, 861	633, 656	360, 936	193, 036	28, 985

COASTAL DISTRICT

The coastal district is comprised of Grays Harbor County and parts of Jefferson, Clallam, and Pacific Counties. The catch in the coastal district amounted to 9,098,732 pounds, valued at $582,122. Considered according to value the important species comprising this catch were salmon, 7,059,942 pounds, valued at $289,722; razor clams, 1,058,516 pounds of meats, valued at $191,121; and crabs, 793,550 pounds, valued at $69,436.

Operating units.—The catch of fishery products in the coastal district of Washington during 1929 was taken by 2,873 fishermen who used 1 motor vessel, 569 motor and other small boats, and 7 major types of gear. The motor vessel had a capacity of 8 tons.

Catch by gear.—Six types of gear accounted for over 99½ per cent of the fishery products taken in this district during 1929. In the order of their importance they were: Pound nets, which accounted for 34 per cent of the catch; gill nets, 34 per cent, which included a negligible amount taken by spears; shovels, 12 per cent; lines, 11 per cent; and crab traps, 9 per cent. The catch by pound nets, gill nets and spears, and lines consisted almost entirely of salmon, that by shovels entirely razor clams, and that by crab traps exclusively crabs.

Fisheries of the coastal district of Washington, 1929

OPERATING UNITS: BY GEAR

Items	Gill nets		Lines		Pound nets	Traps, crab	Tongs and rakes	Shovels	Spears	Total, exclusive of duplication
	Drift, salmon	Set, salmon	Set	Troll						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							2			2
On boats and shore	164	171	24	11	95	91	11	2,485	15	2,871
Total	164	171	24	11	95	91	13	2,485	15	2,873
Vessels, motor							1			1
Net tonnage							8			8
Boats:										
Motor	129	59	2	7	76	91	4			280
Other		164	22		79		19		15	289
Apparatus:										
Number	129	253	24	35	166	3,640	15	2,485	15	
Square yards	286,260	107,019								
Hooks			2,400	105						

CATCH: BY GEAR

Species	Gill nets				Lines			
	Drift		Set[1]		Set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut							2,071	$173
"Lingcod"							47,710	477
Perch					3,250	$162		
Rockfishes							13,150	131
Salmon:								
Blueback, red or sockeye			479,166	$55,903				
Chinook or king	258,566	$15,514	55,407	3,284			580,349	71,749
Chum or keta	707,580	11,793	1,294,134	21,569				
Silver or coho	88,110	5,287	155,380	9,323			369,802	22,550
Steelhead trout	7,180	718	20,540	1,907				
Sturgeon	25,153	2,012	30	3				
Grand total	1,086,589	35,324	2,004,657	91,989	3,250	162	1,013,082	95,080

Species	Pound nets		Traps		Tongs and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"Lingcod"	31	$1						
Salmon:								
Chinook or king	168,148	10,089						
Chum or keta	2,573,940	42,899						
Silver or coho	329,360	19,762						
Steelhead trout	15,500	1,550						
Sturgeon	2,225	178						
Total	3,089,204	74,479						
SHELLFISH								
Crabs			793,550	$69,436				
Clams, razor							1,058,516	$191,121
Oysters:								
Eastern, market					8,780	$5,698		
Japanese, market					2,656	742		
Native, market					38,448	18,091		
Total			793,550	69,436	49,884	24,531	1,058,516	191,121
Grand total	3,089,204	74,479	793,550	69,436	49,884	24,531	1,058,516	191,121

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[1] Includes catch by spears.

COLUMBIA RIVER DISTRICT

The Columbia River district is comprised of Wahkiakum, Cowlitz, Clarke, Skamania, Klickitat, Benton, Walla Walla, and Asotin Counties, and part of Pacific County. The catch in this district amounted to 13,608,133 pounds, valued at $1,298,033. Considered according to value the more important species comprising this catch were salmon, 9,854,333 pounds, valued at $1,108,462, and steelhead trout, 1,512,233 pounds, valued at $136,102.

Operating units.—The catch of fishery products in the Columbia River district of Washington during 1929 was taken by 1,852 fishermen, who used 8 motor vessels, 1,247 motor and other small boats, and 6 major types of gear. The motor vessels had a capacity of 81 net tons.

Catch by gear.—Five types of gear accounted for 97 per cent of the fishery products taken in this district during 1929. In the order of their importance they were pound nets, which accounted for 35 per cent of the catch; gill nets, 33 per cent; dip nets and haul seines, each, 11 per cent; and lines, 7 per cent. The catch by pound nets, gill nets, haul seines, and lines was principally salmon; and that by dip nets was mainly smelt.

Fisheries of the Columbia River district of Washington, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines	Gill nets		Lines		Pound nets	Fish wheels	Dip nets	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					19				19
On boats and shore	495	719	133	26	194	215	24	166	1,833
Total	495	719	133	26	213	215	24	166	1,852
Vessels, motor					8				8
Net tonnage					81				81
Boats:									
Motor	40	539	120	18	162	148		96	989
Other	60		74	12		133			258
Apparatus:									
Number	51	539	297	49	688	345	34	166	
Length, yards	14,302								
Square yards		1,273,757	72,400						
Hooks				4,900	3,092				

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines, set	
			Drift		Set			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	387,068	$11,612						
Halibut							15,435	$2,156
Salmon:								
Blueback, red or sockeye	28,156	5,408	181,481	$32,667	7,563	$1,361		
Chinook or king	671,075	95,628	2,695,834	386,403	129,262	18,378	43	6
Chum or keta	87,040	2,176	623,648	15,591	34,649	866		
Silver or coho	15,860	1,443	266,552	24,789	3,993	3,713		
Shad	193,146	3,863	96,747	1,935	418	8		
Steelhead trout	167,300	15,057	380,782	34,270	22,739	2,047	26	2
Sturgeon	1,105	75	44,252	2,965	2,833	190	2,599	174
Total	1,550,750	135,262	4,289,296	498,620	201,457	26,563	18,103	2,338

Fisheries of the Columbia River district of Washington, 1929—Continued

CATCH: BY GEAR—Continued

Species	Lines, troll		Pound nets		Fish wheels		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Blueback, red or sockeye			95,833	$17,250	28,093	$5,057	5,863	$1,055
Chinook or king	310,106	$49,617	2,162,663	235,730	194,887	21,243	211,627	30,333
Chum or keta			300,065	7,501	5,293	132	7,039	176
Silver or coho	590,056	44,150	1,197,196	107,747	206	19	250	23
Shad			179,665	3,593	20,631	413		
Smelt							1,281,994	19,230
Steelhead trout			874,088	78,669	16,444	1,480	50,854	4,577
Sturgeon			10,291	6,894	5,383	361		
Total	900,162	93,767	4,819,801	457,348	270,937	28,705	1,557,627	55,394

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—There were 204 persons engaged in Washington during 1929 in transporting the catch of fish. In this trade 84 motor vessels, having a capacity of 1,607 net tons, were operated.

Wholesale.—There were 39 wholesale establishments in the Puget Sound, coastal, and Columbia River districts of Washington engaged chiefly in the handling of fresh and frozen products. These establishments employed 443 persons, who received $729,683 in salaries and wages.

Manufacturing.—There were 76 establishments in Washington engaged primarily in the manufacture of prepared fishery products or by-products. They employed 2,456 persons who received $1,425,897 in salaries and wages. The products manufactured, consisting principally of canned, mild-cured, and kippered salmon and canned clams, were valued at $13,858,998. Detailed statistics of most of the items manufactured may be obtained from Fisheries Document No. 1095, "Fishery Industries of the United States, 1929."

Industries related to the fisheries of Washington, 1929

TRANSPORTING

Items	Number
Men on transporting vessels	204
Transporting vessels, motor	84
Net tonnage	1,607

WHOLESALE

Items	Puget Sound district	Columbia River and coastal districts	Total
Establishments	30	9	39
Persons engaged:			
Proprietors	30	9	39
Salaried employees	93	3	96
Wage earners	286	22	308
Paid to proprietors and salaried employees	$236,198	$18,970	$255,168
Paid to wage earners	453,458	21,057	474,515
Total salaries and wages	689,656	40,027	729,683

Industries related to the fisheries of Washington, 1929—Continued

MANUFACTURING

Items	Number	Products	Quantity	Value
Establishments	76	Dry-salted, cod [1] pounds	4,465,551	$268,341
Persons engaged:		Salted chinook or king salmon do	69,800	5,630
Proprietors	85	Smoked chinook or king salmon [2] do	179,022	49,150
Salaried employees	128	Kippered chinook or king salmon [2] pounds	2,274,308	459,926
Wage earners	2,243	Mild-cured:		
Paid to proprietors and salaried employees	$310,163	Chinook, or king salmon do	3,740,382	1,091,959
Paid to wage earners	1,115,734	Silver, or coho salmon do	483,927	124,682
		Miscellaneous, salted, smoked, and spiced fish pounds	1,321,150	185,797
Total salaries and wages	1,425,897	Canned:		
		Salmon standard cases [3]	1,278,472	10,922,417
		Razor clams—		
		Whole do	7,965	74,920
		Minced do	35,861	315,938
		Hard clams—		
		Whole do	16,075	103,312
		Minced do	3,020	16,646
		Other clam products do	2,931	9,729
		Shad do	3,848	17,415
		Shad roe do	145	4,640
		Salmon eggs do	3,328	80,202
		Miscellaneous [4] do	54	1,464
		By-products:		
		Fish meal, salmon tons	1,163	74,548
		Salmon oil gallons	139,450	52,282
		Total		13,858,998

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[1] Cod were salted in Alaska waters.

[2] Includes a small amount of silver or coho salmon.

[3] A standard case contains forty-eight 1-pound cans of salmon, shad, shad roe, and salmon eggs or 48 No. 1 cans of clam products.

[4] Includes canned crabs, and herring (for bait).

OREGON

In 1929 Oregon employed 21 per cent of the total number of fishermen and accounted for 2 per cent of the total catch of the Pacific coast section. There were 4,193 fishermen employed, which is 2 per cent more than in 1928. Of this total, 118 were employed on fishing vessels and 4,075 in the shore and boat fisheries. The catch amounted to 25,283,649 pounds, valued at $2,605,153. This is a decrease of 8 per cent in the catch and 3 per cent in the value of the catch, as compared with the catch and its value for 1928. Of the total value of the catch, salmon accounted for 86 per cent and steelhead trout 6 per cent. Of the total production, salmon accounted for 80 per cent; steelhead trout, 6 per cent; and shad, 5 per cent.

Operating units.—The catch of fishery products from the Columbia River and coastal districts of Oregon was taken by 4,193 fishermen, 44 motor vessels, 2,484 motor and other small boats, and 8 major types of gear. The vessels had a combined capacity of 422 net tons.

Fisheries of Oregon, 1929

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	----------	----------	3,395	$34
Flounders:				
"Sole"	----------	----------	24,586	957
Other	----------	----------	8,835	353
Hake	----------	----------	250	3
Halibut	133,338	$19,941	382,241	49,865
Herring	----------	----------	151,200	2,297
"Lingcod"	11,816	413	252,368	7,670
Perch	----------	----------	94,331	2,290
Pilchard or sardine	----------	----------	30,115	301
Rockfishes	71,517	3,005	56,688	2,518
Sablefish	46,016	2,299	105,775	4,775
Salmon:				
Blueback, red or sockeye	326,945	58,851	----------	----------
Chinook or king	9,286,022	1,390,321	1,658,334	220,828
Chum or keta	931,097	23,278	1,290,942	32,274
Silver or coho	2,424,954	201,046	4,184,230	318,963
Shad	885,481	17,709	300,171	6,003
Smelt	37,500	562	12,561	804
Steelhead trout	1,325,961	119,322	221,553	26,517
Striped bass	----------	----------	11,619	1,404
Sturgeon	93,184	6,312	3,389	211
Tomcod	----------	----------	235	9
Tuna, albacore	----------	----------	36	4
Total	15,573,831	1,843,059	8,792,854	678,080
SHELLFISH				
Crabs	----------	----------	705,364	50,113
Crawfish	146,000	18,250	----------	----------
Clams:				
Razor	----------	----------	47,213	8,525
Soft	----------	----------	9,387	1,126
Oysters, native, market	----------	----------	9,000	6,000
Total	146,000	18,250	770,964	65,764
Grand total	15,719,831	1,861,309	9,563,818	743,844

COLUMBIA RIVER DISTRICT

The Columbia River district is comprised of Columbia, Washington, Multnomah, Hood River, Wasco, Clackamas, Marion, and Yamhill Counties and part of Clatsop County. The catch in this district amounted to 15,719,831 pounds, valued at $1,861,309. Considered according to value the more important species comprising this catch were: Salmon, 12,969,018 pounds, valued at $1,673,496; steelhead trout, 1,325,961 pounds, valued at $119,322; and halibut, 133,338 pounds, valued at $19,941.

Operating units.—The catch of fishery products in the Columbia River district of Oregon during 1929 was taken by 2,769 fishermen, who used 32 motor vessels, 1,475 motor and other small boats, and 6 major types of gear. The combined capacity of the vessels amounted to 295 net tons.

Catch by gear.—Four types of gear accounted for 98 per cent of the fishery products taken in this district during 1929. Listed in order of their importance they were: Gill nets, which accounted for 58 per cent of the catch; lines, 18 per cent; haul seines, 17 per cent; and pound nets, 5 per cent. The catch by each of these gears was principally salmon and steelhead trout.

Fisheries of the Columbia River district of Oregon, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Traps, crawfish	Total, exclusive of duplication
		Drift salmon	Set, salmon	Trawl and set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				20	72				84
On boats and shore	581	1,492	106	33	308	45	180	42	2,685
Total	581	1,492	106	53	380	45	180	42	2,769
Vessels, motor				5	30				32
Net tonnage				46	274				295
Boats:									
Motor	36	978	104	33	261	28		42	1,397
Other	52		4			24			78
Apparatus:									
Number	45	978	217	332	1,224	67	180	840	
Length, yards	25,600								
Square yards		3,066,470	60,408						
Hooks				36,500	5,358				

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Trawl and set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut					133,338	$19,941		
"Lingcod"					11,816	413		
Rockfishes					71,517	3,005		
Sablefish					46,016	2,299		
Salmon:								
Blueback, red or sockeye	59,821	$10,768	247,970	$44,635				
Chinook or king	1,409,382	260,732	6,629,359	944,684			907,729	$145,140
Chum or keta	47,763	1,194	854,030	21,351				
Silver or coho	90,580	8,243	497,619	45,283			1,614,329	127,545
Shad	565,022	11,300	263,700	5,274				
Steelhead trout	522,542	47,029	557,386	50,153			2,069	183
Sturgeon	2,866	215	80,615	5,442	2,956	200		
Grand total	2,697,976	339,481	9,130,679	1,116,822	265,643	25,858	2,524,127	272,868

Species	Pound nets		Dip nets		Traps	
FISH						
Salmon:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blueback, red or sockeye	18,730	$3,372	424	$76		
Chinook or king	248,700	27,046	90,852	12,719		
Chum or keta	28,316	708	988	25		
Silver or coho	220,283	19,825	2,143	150		
Shad	56,759	1,135				
Smelt			37,500	562		
Steelhead trout	211,973	19,078	31,991	2,879		
Sturgeon	1,160	78	5,587	377		
Total	785,921	71,242	169,485	16,788		
SHELLFISH						
Crawfish					146,000	$18,250
Grand total	785,921	71,242	169,485	16,788	146,000	18,250

COASTAL DISTRICT

The coastal district is comprised of Tillamook, Lincoln, Lane, Douglas, Coos, and Curry Counties, and part of Clatsop County. The catch in this district amounted to 9,563,818 pounds, valued at $743,844. Considered according to value, the more important species were: Salmon, 7,133,506 pounds, valued at $572,065; halibut, 382,241 pounds, valued at $49,865; and steelhead trout, 221,553 pounds, valued at $26,517.

Operating units.—The catch of fishery products in the coastal district of Oregon during 1929 was taken by 1,424 fishermen, who used 12 motor vessels, 1,009 motor and other small boats, and 6 major types of gear. The combined capacity of the vessels was 127 net tons.

Catch by gear.—Two types of gear accounted for 89 per cent of the catch of fishery products taken in this district during 1929. Listed in order of their importance they were: Gill nets, which accounted for 57 per cent, and lines, 32 per cent. The catch by gill nets was principally salmon and that by lines principally salmon, halibut, and "lingcod."

Fisheries of the coastal district of Oregon, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines	Gill nets		Lines		Traps, crab	Tongs	Shovels	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	23	26	--------	--------	--------	34
On boats and shore	9	696	421	--------	141	124	2	212	1,390
Total	9	696	421	23	167	124	2	212	1,424
Vessels, motor	--------	--------	--------	6	10	--------	--------	--------	12
Net tonnage	--------	--------	--------	77	105	--------	--------	--------	127
Boats:									
Motor	3	504	165	--------	119	124	1	--------	717
Other	3	9	283	--------	--------	--------	2	--------	292
Apparatus:									
Number	3	513	1,156	125	526	2,232	2	212	--------
Length, yards	453	--------	--------	--------	--------	--------	--------	--------	--------
Square yards	--------	540,736	186,516	--------	--------	--------	--------	--------	--------
Hooks	--------	--------	--------	17,050	2,362	--------	--------	--------	--------

Fisheries of the coastal district of Oregon, 1929—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Trawl and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	3, 395	$34						
Flounders:								
"Sole"	15	1			24, 571	$956		
Other	5, 922	236			2, 913	117		
Hake	250	3						
Halibut					381, 308	49, 782	933	$83
Herring	151, 200	2, 297						
"Lingcod"					187, 877	5, 565	64, 491	2, 105
Perch	77, 531	1, 912	16, 800	$378				
Pilchard or sardine	30, 115	301						
Rockfishes					45, 099	2, 140	11, 589	378
Sablefish					105, 775	4, 775		
Salmon:								
Chinook or king			1, 143, 518	154, 375			514, 816	66, 453
Chum or keta			1, 290, 829	32, 271			113	3
Silver or coho			2, 497, 960	199, 837			1, 686, 270	119, 126
Shad			300, 131	6, 002			40	1
Smelt	6, 100	287	6, 461	517				
Steelhead trout			218, 067	26, 168			3, 486	349
Striped bass			11, 619	1, 404				
Sturgeon			2, 678	161			711	50
Tomcod					235	9		
Tuna, albacore					36	4		
Grand total	274, 528	5, 071	5, 488, 063	421, 113	747, 814	63, 348	2, 282, 449	188, 548

Species	Traps		Tongs		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	705, 364	$50, 113				
Clams:						
Razor					47, 213	$8, 525
Soft					9, 387	1, 126
Oysters, native, market			9, 000	$6, 000		
Grand total	705, 364	50, 113	9, 000	6, 000	56, 600	9, 651

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—There were 50 persons in Oregon during 1929 engaged in transporting the catch of fish. In this trade 28 motor vessels having a total capacity of 301 net tons, were operated.

Wholesale.—There were 20 wholesale establishments in the Columbia River and coastal districts of Oregon engaged primarily in handling fresh and frozen products. These establishments employed 118 persons, who received $127,679 in salaries and wages.

Manufacturing.—There were 29 establishments in Oregon during 1929 engaged primarily in the manufacture of prepared fishery products or by-products. They employed 872 persons, who received $763,516 in salaries and wages. The products manufactured, consisting principally of canned and mild-cured salmon, were valued at $5,658,861. Detailed statistics of most of the items manufactured may be obtained from Fisheries Document No. 1095, "Fishery Industries of the United States, 1929."

Industries related to the fisheries of Oregon, 1929

TRANSPORTING

Items	Number
Men on transporting vessels	50
Transporting vessels, motor	28
Net tonnage	301

WHOLESALE

Items	Columbia River district	Coastal district	Total
Establishments	7	13	20
Persons engaged:			
Proprietors	7	13	20
Salaried employees	6	6	12
Wage earners	42	44	86
Paid to proprietors and salaried employees	$22,542	$28,149	$50,691
Paid to wage earners	38,339	38,649	76,988
Total salaries and wages	60,881	66,798	127,679

MANUFACTURING

Items	Number
Establishments	29
Persons engaged:	
Proprietors	25
Salaried employees	59
Wage earners	788
Paid to proprietors and salaried employees	$158,496
Paid to wage earners	605,020
Total salaries and wages	763,516

Products	Quantity	Value
Mild-cured:		
Chinook or king salmon pounds	1,642,425	$534,365
Silver or coho salmon do	1,068,400	268,446
Canned:		
Salmon standard cases[1]	339,300	4,644,377
Shad do	12,882	65,538
Shad roe do	1,263	40,416
Razor clam products—		
Whole do	518	4,497
Minced do	1,754	15,125
Other products[2]		86,097
Total		5,658,861

[1] A standard case contains forty-eight 1-pound cans of salmon, shad, and shad roe, or 48 No. 1 cans of clam products.

[2] Includes salted sablefish, canned salmon eggs (for bait), salmon meal, and salmon oil.

CALIFORNIA

In 1929 California was by far the most important among the Pacific Coast States in regard to fisheries, employing 34 per cent of the total number of fishermen and accounting for 83 per cent of the total catch. There were 6,772 fishermen employed, which is 1 per cent less than in 1928. Of this number 3,392 were engaged on fishing vessels and 3,380 in the shore and boat fisheries.

The catch amounted to 856,926,074 pounds, valued at $12,870,484. This is an increase of 47 per cent in the catch and 25 per cent in the value of the catch as compared with the catch and its value for 1928. Of the total value of the catch, that for pilchard or sardine accounted for 28 per cent; yellowfin tuna, 17 per cent; skipjack or striped tuna, 8 per cent; mackerel, 7 per cent; flounders, 6 per cent; and salmon, barracuda, and bluefin tuna, each, 4 per cent. Of the total production, pilchard or sardine accounted for 76 per cent; mackerel, 7 per cent; yellowfin tuna, 4 per cent; skipjack or striped tuna, 3 per cent; and flounders, 2 per cent. Of the total catch, 787,385,866 pounds valued at $9,145,369 were taken off the coast of California.

The remainder of the catch was taken off the coast of Latin America, except the cod which was taken in Alaska waters.

Operating units.—The catch of fishery products from the northern San Francisco, Monterey, and southern districts of California was taken by 6,772 fishermen, 5 steam vessels, 437 motor vessels, 2 sailing vessels, 1,927 motor and other small boats, and 16 major types of gear. The vessels had a combined capcity of 12,313 net tons.

Fisheries of California, 1929

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district		Monterey district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			239, 575	$2, 396	81, 975	$1, 023
Barracuda					28	3
Carp			84, 937	2, 338		
Catfish	45, 240	$6, 867	460, 919	66, 223		
Cod			4, 915, 151	82, 510		
Eels			10	1		
Flounders:						
"California halibut"					28, 943	3, 726
"Sole"	186, 649	5, 876	10, 672, 792	480, 299	626, 365	31, 377
Other	69, 678	2, 678	1, 428, 925	69, 054	115, 307	4, 648
Grayfish			365, 531	2, 107	134, 199	686
Hake	130	2	131, 323	2, 626	14, 216	143
Halibut	699, 712	83, 398	50, 814	5, 025		
Hardhead			55, 410	7, 868		
Herring	31, 374	481	921, 001	9, 210	375	4
Horse mackerel					38, 778	1, 822
Kingfish	30	1	44, 902	1, 537	112, 281	5, 681
"Lingcod"	380, 795	13, 432	573, 548	22, 612	206, 278	11, 880
Mackerel			32, 246	967	1, 021, 790	31, 976
Perch	44, 792	1, 822	106, 322	4, 253	55, 983	2, 834
Pilchard or sardine			41, 091, 857	215, 597	323, 381, 282	1, 787, 597
Pompano			250	112	252	121
Rockfishes	257, 628	9, 227	1, 074, 159	46, 036	1, 641, 049	75, 955
Sablefish	463, 644	19, 871	499, 424	20, 896	472, 913	14, 100
Salmon	2, 750, 560	292, 728	1, 240, 215	142, 958	1, 054, 096	123, 781
Sculpin	242	5			954	95
Sea bass, white or squeteague	44	1	67, 284	8, 074	41, 353	4, 217
Shad			1, 602, 970	51, 597		
Skates	390	8	317, 920	6, 358	83, 287	1, 571
Smelt	94, 014	6, 089	124, 211	9, 937	187, 994	13, 474
Splittail			8, 738	461		
Squawfish			3, 264	131		
Striped bass			528, 981	79, 185		
Suckers			842	33		
Tomcod			15, 822	633	62	2
Tuna and tunalike fishes: Bonito					910	45
Whitebait	169, 651	9, 750	65, 539	5, 243	7, 929	776
Other fish	23, 023	659	27, 126	565	205, 120	1, 630
Total	5, 217, 596	452, 895	66, 752, 008	1, 346, 842	329, 513, 719	2, 119, 167
SHELLFISH, ETC.						
Crabs	63, 696	5, 783	1, 691, 784	154, 345	37, 296	3, 334
Shrimp			3, 054, 748	45, 822		
Abalone	1, 750	302			682, 474	136, 495
Clams:						
Cockle	7	4	6, 438	3, 219		
Pismo					2, 373	989
Soft			16, 908	9, 374	10	2
Mixed	1, 609	697	403	179		
Mussels			83	33	20	3
Octopus	4, 033	319	14, 112	1, 411	68, 548	7, 211
Oysters:						
Eastern, market			43, 725	21, 862		
Native, market	108	54	8, 665	4, 332	522	261
Squid			445	44	4, 572, 555	72, 243
Total	71, 203	7, 159	4, 837, 311	240, 621	5, 363, 798	220, 538
WHALE PTODUCTS						
Whale oil			5, 329, 994	365, 111		
Other products			208, 000	3, 586		
Total			5, 537, 994	368, 697		
Grand total	5, 288, 799	460, 054	77, 127, 313	1, 956, 160	334, 877, 517	2, 339, 705

Fisheries of California, 1929—Continued

CATCH: BY DISTRICTS—Continued

Species	Southern district—off California			
	San Pedro division		San Diego division	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Anchovies	60, 895	$1, 048		
Barracuda	3, 046, 519	269, 507	879, 352	$71, 836
Eels	317	6		
Flounders:				
"California halibut"	677, 402	93, 513	105, 082	16, 639
"Sole"	211, 577	8, 752	8, 162	1, 135
Other	19, 910	4, 916		
Grayfish	201, 994	6, 867	132, 228	869
Herring	325	10	4, 488	61
Horse mackerel	659, 512	16, 589		
Kingfish	316, 087	6, 116	3, 146	102
"Lingcod"	3, 542	204		
Mackerel	47, 898, 798	725, 834	9, 021, 118	119, 718
Mullet	4, 744	474	25, 775	2, 246
Perch	103, 189	8, 666	230	10
Pilchard or sardine	283, 369, 382	1, 558, 531	3, 929, 383	25, 739
Pompano	2, 032	1, 012	256	41
Rock bass	321, 258	24, 264	114, 019	7, 185
Rockfishes	1, 613, 483	95, 441	1, 414, 924	79, 263
Sablefish	3, 427	198		
Sculpin	82, 282	8, 513	25, 515	2, 599
Sea bass:				
Black	63, 254	3, 982	100, 839	4, 891
White or squeteague	673, 598	92, 786	173, 277	22, 263
Sheepshead	258, 203	12, 277	26, 391	1, 179
Skates	21, 503	428	4, 652	93
Smelt	489, 839	26, 327	16, 672	1, 456
Swordfish	186, 823	26, 776	505, 484	62, 172
Tuna and tunalike fishes:				
Albacore	179, 861	26, 979	89, 195	13, 380
Bluefin	6, 213, 842	410, 913	1, 262, 528	75, 888
Bonito	348, 787	11, 683	244, 189	6, 386
Skipjack or striped tuna	4, 808, 441	208, 879	3, 223, 636	129, 176
Yellowfin	150, 249	9, 516	49, 195	3, 256
Whitefish	111, 373	7, 214	76, 227	3, 844
Yellowtail	107, 743	7, 107	742, 202	32, 758
Other fish	97, 046	4, 728	288	14
Total	352, 307, 237	3, 680, 056	22, 178, 453	684, 199
SHELLFISH, ETC.				
Sea crawfish or spiny lobster	273, 804	66, 026	122, 970	24, 584
Abalone	9, 505	2, 562		
Clams:				
Cockle	2, 283	1, 125		
Pismo	25, 063	9, 275		
Mixed			13	5
Octopus	430	54		
Squid	87, 572	4, 070		
Turtles			58	4
Total	398, 657	83, 112	123, 041	24, 593
Grand total	352, 705, 894	3, 763, 168	22, 301, 494	708, 792

Fisheries of California, 1929—Continued

CATCH: BY DISTRICTS—Continued

Species	Southern district—off Latin America				Total southern district	
	San Pedro division		San Diego division			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	-------	-------	-------	-------	60,895	$1,048
Barracuda	1,007,628	$155,007	295,083	$33,727	5,228,582	530,077
Eels	-------	-------	-------	-------	317	6
Flounders:						
"California halibut"	39,098	5,093	252,048	35,461	1,073,630	150,706
"Sole"	910	46	-------	-------	220,649	9,933
Other	-------	-------	123	9	20,033	4,925
Grayfish	33	1	-------	-------	334,255	7,737
Herring	-------	-------	-------	-------	4,813	71
Horse mackerel	10,501	1,022	-------	-------	670,013	17,611
Kingfish	-------	-------	51	2	319,284	6,220
"Lingcod"	-------	-------	-------	-------	3,542	204
Mackerel	-------	-------	1,405	43	56,921,321	845,595
Mullet	18,028	1,851	16,047	943	64,594	5,514
Perch	678	46	-------	-------	104,097	8,722
Pilchard or sardine	-------	-------	-------	-------	287,298,765	1,584,270
Pompano	19,735	2,692	2,913	248	24,936	3,993
Rock bass	10,060	403	37,199	2,861	482,536	34,713
Rockfishes	1,606	130	31,929	1,353	3,061,942	176,187
Sablefish	-------	-------	-------	-------	3,427	198
Sculpin	-------	-------	-------	-------	107,797	11,112
Sea bass:						
Black	46,891	2,926	193,227	11,022	404,211	22,821
White or squeteague	247,556	23,894	359,120	41,837	1,453,551	180,780
Sheepshead	239	9	3,589	166	288,422	13,631
Skates	-------	-------	234	5	26,389	526
Smelt	567	51	704	79	507,782	27,913
Swordfish	-------	-------	774	193	693,081	89,141
Tuna and tunalike fishes:						
Albacore	-------	-------	45	7	269,101	40,366
Bluefin	10,210	715	40,277	2,446	7,526,857	489,962
Bonito	2,280,104	78,666	44,554	1,348	2,917,634	98,083
Skipjack or striped tuna	6,791,701	247,886	12,173,833	494,830	26,997,611	1,080,771
Yellowfin	11,911,883	634,685	25,287,334	1,552,909	37,398,661	2,200,366
Whitefish	4,131	299	9,994	496	201,725	11,853
Yellowtail	1,249,601	65,342	975,718	44,741	3,075,264	149,948
Other fish	95,288	5,859	155,342	7,701	347,964	18,302
Total	23,746,448	1,226,623	39,881,543	2,232,427	438,113,681	7,823,305
SHELLFISH, ETC.						
Sea crawfish or spiny lobster	-------	-------	994,908	183,380	1,391,682	273,990
Abalone	-------	-------	-------	-------	9,505	2,562
Clams:						
Cockle	-------	-------	-------	-------	2,283	1,125
Pismo	-------	-------	-------	-------	25,063	9,275
Mixed	-------	-------	-------	-------	13	5
Octopus	-------	-------	-------	-------	430	54
Squid	-------	-------	-------	-------	87,572	4,070
Turtles	-------	-------	2,158	175	2,216	179
Total	-------	-------	997,066	183,555	1,518,764	291,260
Grand total	23,746,448	1,226,623	40,878,609	2,415,982	439,632,445	8,114,565

Fisheries of California, 1929—Continued

CATCH: BY WATERS

Species	Off California[1]		Off Latin America	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Anchovies	382, 445	$4, 467	----------	----------
Barracuda	3, 925, 899	341, 346	1, 302, 711	$188, 734
Carp	84, 937	2, 338	----------	----------
Catfish	506, 159	73, 090	----------	----------
Cod	4, 915, 151	82, 510	----------	----------
Eels	327	7	----------	----------
Flounders:				
"California halibut"	811, 427	113, 878	291, 146	40, 554
"Sole"	11, 705, 545	527, 439	910	46
Other	1, 633, 820	81, 296	123	9
Grayfish	833, 952	10, 529	33	1
Hake	145, 669	2, 771	----------	----------
Halibut	750, 526	88, 423	----------	----------
Hardhead	55, 410	7, 868	----------	----------
Herring	957, 563	9, 766	----------	----------
Horse mackerel	698, 290	18, 411	10, 501	1, 022
Kingfish	476, 446	13, 437	51	2
"Lingcod"	1, 164, 163	48, 128	----------	----------
Mackerel	57, 973, 952	878, 495	1, 405	43
Mullet	30, 519	2, 720	34, 075	2, 794
Perch	310, 516	17, 585	678	46
Pilchard or sardine	651, 771, 904	3, 587, 464	----------	----------
Pompano	2, 790	1, 286	22, 648	2, 940
Rock bass	435, 277	31, 449	47, 259	3, 264
Rockfishes	6, 001, 243	305, 922	33, 535	1, 483
Sablefish	1, 439, 408	55, 065	----------	----------
Salmon	5, 044, 871	559, 467	----------	----------
Sculpin	108, 993	11, 212	----------	----------
Sea bass:				
Black	164, 093	8, 873	240, 118	13, 948
White or squeteague	955, 556	127, 341	606, 676	65, 731
Shad	1, 602, 970	51, 597	----------	----------
Sheepshead	284, 594	13, 456	3, 828	175
Skates	427, 752	8, 458	234	5
Smelt	912, 730	57, 283	1, 271	130
Splittail	8, 738	461	----------	----------
Squawfish	3, 264	131	----------	----------
Striped bass	528, 981	79, 185	----------	----------
Suckers	842	33	----------	----------
Swordfish	692, 307	88, 948	774	193
Tomcod	15, 884	635	----------	----------
Tuna and tunalike fishes:				
Albacore	269, 056	40, 359	45	7
Bluefish	7, 476, 370	486, 801	50, 487	3, 161
Bonito	593, 886	18, 114	2, 324, 658	80, 014
Skipjack or striped tuna	8, 032, 077	338, 055	18, 965, 534	742, 716
Yellowfin	199, 444	12, 772	37, 199, 217	2, 187, 594
Whitebait	243, 119	15, 769	----------	----------
Whitefish	187, 600	11, 058	14, 125	795
Yellowtail	849, 945	39, 865	2, 225, 319	110, 083
Other fish	352, 603	7, 596	250, 630	13, 560
Total	775, 969, 013	8, 283, 159	63, 627, 991	3, 459, 050
SHELLFISH, ETC.				
Crabs	1, 792, 776	163, 462	----------	----------
Sea crawfish or spiny lobster	396, 774	90, 610	994, 908	183, 380
Shrimp	3, 054, 748	45, 822	----------	----------
Abalone	693, 729	139, 359	----------	----------
Clams:				
Cockle	8, 728	4, 348	----------	----------
Pismo	27, 436	10, 264	----------	----------
Soft	16, 918	9, 376	----------	----------
Mixed	2, 025	881	----------	----------
Mussels	103	36	----------	----------
Octopus	87, 123	8, 995	----------	----------
Oysters:				
Eastern, market	43, 725	21, 862	----------	----------
Native, market	9, 295	4, 647	----------	----------
Squid	4, 660, 572	76, 357	----------	----------
Turtles	58	4	2, 158	175
Total	10, 794, 010	576, 023	997, 066	183, 555
WHALE PRODUCTS				
Whale oil	5, 329, 994	365, 111	----------	----------
Other products	208, 000	3, 586	----------	----------
Total	5. 537, 994	368, 697	----------	----------
Grand total	792, 301, 017	9, 227, 879	64, 625, 057	3, 642, 605

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[1] The catch of cod was taken in Alaska waters.

NORTHERN DISTRICT

The northern district is comprised of Del Norte, Humboldt, Mendocino, Sonoma, and Lake Counties. The catch in this district amounted to 5,288,799 pounds, valued at $460,054. Considered according to value the more important species comprising this catch were: Salmon, 2,750,560 pounds, valued at $292,728; halibut, 699,712 pounds, valued at $83,398; sablefish, 463,644 pounds, valued at $19,871; and "lingcod," 380,795 pounds, valued at $13,432.

Operating units.—The catch of fishery products in this district was taken by 532 fishermen, 13 motor vessels, 376 motor and other small boats, and 10 major types of gear. The combined capacity of the vessels amounted to 148 net tons.

Catch by gear.—Three types of gear accounted for 91 per cent of the fishery products taken in this district during 1929. In the order of their importance they were: Lines, which accounted for 79 per cent of the catch; gill nets, 7 per cent; and paranzella nets, 5 per cent. The catch by gill nets consisted principally of salmon; that by lines chiefly salmon, halibut, and sablefish; and that by paranzella nets mainly flounders.

Fisheries of the northern district of California, 1929

OPERATING UNITS: BY GEAR

Items	Haul seines	Gill nets		Lines		Dip nets	Paranzella nets
		Drift, salmon	Other	Trawl and hand	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				20	17		11
On boats	16	228	7	164	217	53	2
Total	16	228	7	184	234	53	13
Vessels:							
Motor				7	8		3
Net tonnage				82	70		36
Boats:							
Motor	10		5	87	181	4	1
Other	1	153	1	38		49	
Apparatus:							
Number	10	153	6	471	804	53	2
Length, yards	1,550						
Square yards		139,721	2,558				
Yards at mouth							33
Hooks				74,688	3,748		

Items	Beam trawls	Traps		Rakes	Shovels	Abalone outfits	Total, exclusive of duplication
		Crab	Octopus				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							37
On boats	2	22	1	3	5	6	495
Total	2	22	1	3	5	6	532
Vessels:							
Motor							13
Net tonnage							148
Boats:							
Motor	1	16	1		2		185
Other		2			3	6	191
Apparatus:							
Number	1	315	12	3	5	6	
Yards at mouth	7						

Fisheries of the northern district of California, 1929—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines, trawl and hand	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish					45,240	$6,867
Flounders:						
"Sole"					5,311	130
Other	8,629	$431				
Halibut					679,081	81,249
Herring	31,374	481				
Kingfish	30	1				
"Lingcod"	33	2			313,201	11,710
Perch	39,110	1,591	1,141	$47		
Rockfishes	101	5			220,723	8,079
Sablefish					463,644	19,871
Salmon	40,444	2,735	379,723	42,409		
Sculpin					233	4
Smelt	63,016	4,461	11,611	835		
Whitebait	551	26				
Other fish					20,360	603
Total	183,288	9,733	392,475	43,291	1,747,793	128,513
SHELLFISH						
Octopus					2,915	231
Grand total	183,288	9,733	392,475	43,291	1,750,708	128,744

Species	Lines, troll		Dip nets		Paranzella nets	
FISH						
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"Sole"					169,856	$5,383
Other					60,564	2,228
Hake					130	2
Halibut	20,616	$2,147			15	2
"Lingcod"	49,669	1,094			16,470	574
Perch			4,532	$183		
Rockfishes	14,655	368			20,108	712
Salmon	2,330,393	247,584				
Sea bass, white or squeteague	44	1				
Skates					390	8
Smelt			19,387	793		
Whitebait			169,100	9,724		
Other fish	1,019	21			1,430	30
Grand total	2,416,396	251,215	193,019	10,700	268,963	8,939

Species	Beam trawls		Traps		Rakes	
FISH						
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"Sole"	11,482	$363				
Other	485	119				
"Lingcod"	1,422	52				
Perch	9	1				
Rockfishes	2,041	63				
Sculpin	9	1				
Other fish	214	5				
Total	15,662	504				
SHELLFISH						
Crabs			63,696	$5,783		
Octopus			1,118	88		
Oysters, native, market					108	$54
Total			64,814	5,871	108	54
Grand total	15,662	504	64,814	5,871	108	54

Species	Shovels		Abalone outfits	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*
Abalone			1,750	$302
Clams:				
Cockle	7	$4		
Mixed	1,609	697		
Grand total	1,616	701	1,750	302

SAN FRANCISCO DISTRICT

The San Francisco district is comprised of Marin, Solano, Yolo, Sacramento, San Joaquin, Alameda, Contra Costa, San Francisco, and San Mateo Counties. The catch in this district amounted to 77,127,313 pounds, valued at $1,956,160. Considered according to value, the more important species comprising this catch were: Flounders, 12,101,717 pounds, valued at $549,353; whale products, 5,537,994 pounds, valued at $368,697; pilchard or sardine, 41,091,857 pounds, valued at $215,597; crabs, 1,691,784 pounds, valued at $154,345; and salmon, 1,240,215 pounds, valued at $142,958.

Operating units.—The catch of fishery products in the San Francisco district during 1929 was taken by 1,263 fishermen, 5 steam vessels, 29 motor vessels, 2 sailing vessels, 642 motor and other small boats, and 12 major types of gear. The combined capacity of the vessels amounted to 1,504 net tons.

Catch by gear.—Five types of gear accounted for 92 per cent of the fishery products taken in this district during 1929. Listed in the order of their importance they were: Lampara nets, which accounted for 54 per cent; paranzella nets, 18 per cent; lines, 8 per cent; harpoons, 7 per cent; and gill nets, 5 per cent. The catch by lampara nets was chiefly pilchard or sardine, that by paranzella nets principally flounders, that by lines largely cod taken in Alaska waters, that by harpoons exclusively whales, and that by gill nets chiefly shad, herring, salmon, and striped bass.

Fisheries of the San Francisco district of California, 1929

OPERATING UNITS: BY GEAR

Items	Lampara nets, sardine	Gill nets					Lines		Fyke nets
		Drift, salmon	Shad	Striped bass	Sea bass	Other	Set and hand	Troll	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	52						93	2	
On boats	86	339	351	217	34	66	38	272	82
Total	138	339	351	217	34	66	131	274	82
Vessels:									
Motor	5						2	1	
Net tonnage	45						16	7	
Sail							2		
Net tonnage							876		
Total vessels	5						4	1	
Total net tonnage	45						892	7	
Boats:									
Motor	16	179	179	114	23	36	23	260	28
Other		6	5	14		3			39
Apparatus:									
Number	21	185	184	128	23	61	381	965	1,920
Length, yards	3,600								
Square yards		567,580	630,752	319,488	38,640	63,288			
Hooks							47,622	4,704	

Fisheries of the San Francisco district of California, 1929—Continued

OPERATING UNITS: BY GEAR—Continued

Items	Bag nets, shrimp	Paranzella nets	Beam trawls	Traps, crab	Harpoons, whaling	Tongs,	Rakes	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	23	90			44				296
On boats	25		25	203		12	1	20	967
Total	48	90	25	203	44	12	1	20	1,263
Vessels:									
Steam		1			4				5
Net tonnage		26			241				267
Motor	4	19							29
Net tonnage	24	285							361
Sail									2
Net tonnage									876
Total vessels	4	20			4				36
Total net tonnage	24	311			241				1,504
Boats:									
Motor	8		25	203		7		7	581
Other						7	1	5	61
Apparatus:									
Number	12	10	25	3,772	4	12	1	20	
Length, yards	6,272								
Yards at mouth		167	167						

CATCH: BY GEAR

Species	Lampara nets		Gill nets		Lines			
					Set and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	239,575	$2,396						
Carp			41,497	$830				
Cod					4,915,151	$82,510		
Eels					10	1		
Flounders:								
"Sole"					4,619	231		
Other	240	14	1,257	40	1,632	82		
Grayfish	6,882	138	3,155	63	8,499	170	25	$1
Halibut			435	44	287	29	2,874	230
Herring	6,800	68	914,201	9,142				
Kingfish	19,029	761						
"Lingcod"			179	7	246,625	9,865	16,462	329
Mackerel	32,246	967						
Perch	11,966	479	92,676	3,707				
Pilchard or sardine	41,091,332	215,592						
Rockfishes					454,697	18,188	1,118	23
Sablefish					183,701	8,267		
Salmon			581,497	64,042			658,718	78,916
Sea bass, white or squeteague	445	53	66,839	8,021				
Shad			1,602,970	51,597				
Skates					500	10		
Smelt	5,396	432	118,815	9,505				
Squawfish			1,976	79				
Striped bass			528,981	79,185				
Suckers			364	11				
Tomcod	7,665	307						
Whitebait	65,539	5,243						
Other fish			913	18	4,533	113		
Total	41,487,115	226,450	3,955,755	226,291	5,820,254	119,466	679,197	79,499
SHELLFISH								
Shrimp	182	3						
Octopus					10,615	1,061		
Squid	445	44						
Total	627	47			10,615	1,061		
Grand total	41,487,742	226,497	3,955,755	226,291	5,830,869	120,527	679,197	79,499

Fisheries of the San Francisco district of California, 1929—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Bag nets		Paranzella nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	43,440	$1,508				
Catfish	460,919	66,223				
Flounders:						
"Sole"					10,668,173	$480,068
Other					1,425,796	68,918
Grayfish					346,970	1,735
Hake					131,323	2,626
Halibut					47,218	4,722
Hardhead	55,410	7,868				
Kingfish					25,873	776
"Lingcod"					310,282	12,411
Perch					1,680	67
Pilchard or sardine					525	5
Pompano					250	112
Rockfishes					618,344	27,825
Sablefish					315,723	12,629
Skates					317,420	6,348
Splittail	8,738	461				
Squawfish	1,288	52				
Suckers	478	22				
Tomcod					8,157	326
Other fish					21,680	434
Total	570,273	76,134			14,239,414	619,002
SHELLFISH						
Crabs					8,728	796
Shrimp			1,506,531	$22,598		
Octopus					3,497	350
Total			1,506,531	22,598	12,225	1,146
Grand total	570,273	76,134	1,506,531	22,598	14,251,639	620,148

Species	Beam trawls		Traps, crab		Harpoons	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs			1,683,056	$153,549		
Shrimp	1,548,035	$23,221				
Total	1,548,035	23,221	1,683,056	153,549		
WHALE PRODUCTS						
Whale oil					5,329,994	$365,111
Other products					208,000	3,586
Total					5,537,994	368,697
Grand total	1,548,035	23,221	1,683,056	153,549	5,537,994	368,697

Species	Tongs		Rakes		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:						
Cockle					6,438	$3,219
Soft					16,908	9,374
Mixed					403	179
Mussels			83	$33		
Oysters:						
Eastern, market	43,725	$21,862				
Native, market	8,665	4,332				
Grand total	52,390	26,194	83	33	23,749	12,772

MONTEREY DISTRICT

The Monterey district is comprised of Monterey and Santa Cruz Counties. The catch in this district amounted to 334,877,517 pounds, valued at $2,339,705. The most important product contributing to this catch was pilchard or sardine, the catch of which amounted to 323,381,282 pounds, valued at $1,787,597. Other important species were abalone, 682,474 pounds, valued at $136,495; salmon, 1,054,096 pounds, valued at $123,781; rockfishes, 1,641,049 pounds, valued at $75,955; and squid, 4,572,555 pounds, valued at $72,243.

Operating units.—The catch of fishery products in the Monterey district in 1929 was taken by 1,197 fishermen, 36 motor vessels, 285 motor and other small boats, and 10 major types of gear. The combined capacity of the vessels amounted to 526 net tons.

Catch by gear.—Three types of gear accounted for 99 per cent of the fishery products taken in this district during 1929. Listed in the order of their importance, they were: Lampara nets, which accounted for 76 per cent of the catch; purse seines, 22 per cent; and lines, 1 per cent. The catch by lampara nets was principally sardine or pilchard, that by purse seines almost exclusively pilchard or sardine, and that by lines chiefly rockfishes, salmon, and mackerel.

Fisheries of the Monterey district of California, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines, sardine	Lampara nets		Gill nets		Lines		Paranzella nets
		Sardine	Squid	Drift, sea bass	Other	Set and hand	Troll	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	70	259	73			8	8	
On boats		522	225	34	69	193	237	6
Total	70	781	298	34	69	201	245	6
Vessels, motor	7	21	12			2	6	
Net tonnage	288	175	95			16	44	
Boats:								
Motor		43	37	31	53	167	228	2
Other				1		13		
Apparatus:								
Number	7	64	49	32	65	1,067	505	1
Length, yards	2,940	20,977	10,914					
Square yards				64,345	122,150			
Yards at mouth								17
Hooks						149,408	3,132	

Items	Traps		Tongs	Rakes	Shovels	Abalone outfits	Total, exclusive of duplication
	Crab	Octopus					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						40	369
On boats	3	7	3	2	11	25	828
Total	3	7	3	2	11	65	1,197
Vessels, motor						8	36
Net tonnage						63	526
Boats:							
Motor	1	6		2		5	265
Other	2	1			2		20
Apparatus: Number	30	47	3	2	11	13	

Fisheries of the Monterey district of California, 1929—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara nets		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			81, 975	$1, 023		
Barracuda					28	$3
Flounders:						
"California halibut"			631	77	60	7
Other			236	10		
Grayfish					200	10
Herring					375	4
Horse mackerel			35, 195	1, 554	3, 502	263
Kingfish			24, 168	1, 071	82, 051	4, 364
"Lingcod"			141	8		
Mackerel			77, 733	1, 459	181	7
Perch			21, 169	1, 262	30, 251	1, 367
Pilchard or sardine	72, 902, 779	$400, 965	250, 478, 503	1, 386, 632		
Pompano			244	117	8	4
Rockfishes			2, 139	152		
Sea bass: White or squeteague	199	24	4, 425	439	36, 578	3, 741
Skates			440	8		
Smelt			47, 717	3, 741	140, 076	9, 710
Tuna and tunalike fishes: Bonito					910	45
Whitebait			7, 473	734	456	42
Other fish			121	7		
Total	72, 902, 978	400, 989	250, 782, 310	1, 398, 294	294, 676	19, 567
SHELLFISH						
Crabs					37, 224	3, 327
Squid			4, 572, 555	72, 243		
Total			4, 572, 555	72, 243	37, 224	3, 327
Grand total	72, 902, 978	400, 989	255, 354, 865	1, 470, 537	331, 900	22, 894

Species	Lines				Paranzella nets	
	Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:						
"California halibut"	15, 960	$2, 164	461	$58	11, 831	$1, 420
Sole	8, 734	495			617, 631	30, 882
Other	5, 471	200			109, 600	4, 438
Grayfish	235	7			133, 764	669
Hake	230	3			13, 986	140
Horse mackerel	81	5				
Kingfish					6, 062	246
"Lingcod"	167, 278	9, 869	7, 946	457	30, 913	1, 546
Mackerel	642, 612	21, 141	301, 264	9, 369		
Perch					4, 563	205
Rockfishes	1, 602, 742	74, 217	5, 183	192	30, 985	1, 394
Sablefish	444, 214	13, 268			28, 699	832
Salmon			1, 054, 096	123, 781		
Sculpin	954	95				
Sea bass: White or squeteague	151	13				
Skates	3, 681	69			79, 166	1, 494
Smelt	201	23				
Tomcod					62	2
Other fish	2, 437	28			202, 562	1, 595
Total	2, 894, 981	121, 597	1, 368, 950	133, 857	1, 269, 824	44, 863
SHELLFISH						
Octopus	5, 052	572			35	4
Grand total	2, 900, 033	122, 169	1, 368, 950	133, 857	1, 269, 859	44, 867

Species	Traps		Tongs		Rakes		Shovels		Abalone outfits	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	72	$7								
Abalone									682, 474	$136, 495
Clams:										
Pismo							2, 373	$989		
Soft							10	2		
Mussels					20	$3				
Octopus	63, 461	6, 635								
Oysters: Native, market			522	$261						
Total	63, 533	6, 642	522	261	20	3	2, 383	991	682, 474	136, 495

SOUTHERN DISTRICT

The combined catch of the San Pedro and San Diego divisions, which comprise the southern district, amounted to 439,632,445 pounds, valued at $8,114,565. This includes the catch off the coast of California and that off the coast of Latin America. Considered according to value the more important species contributing to this catch were: Yellowfin tuna, 37,398,661 pounds, valued at $2,200,366; pilchard or sardine, 287,298,765 pounds, valued at $1,584,270; skipjack or striped tuna, 26,997,611 pounds, valued at $1,080,771; and mackerel, 56,921,321 pounds, valued at $845,595.

The operating units and catch of the principal species are discussed for each division individually in the following paragraphs.

San Pedro Division

The San Pedro division is comprised of San Luis Obispo, Santa Barbara, Ventura, Los Angeles, and Orange Counties.

Operating units.—The catch of fishery products in the San Pedro division was taken by 2,802 fishermen, 249 motor vessels, 459 motor and other small boats, and 10 major types of gear. The combined capacity of the vessels amounted to 6,335 net tons.

OFF CALIFORNIA

That part of the catch in this division taken off the California coast amounted to 352,705,894 pounds, valued at $3,763,168. Considered according to value the more important species were: Pilchard or sardine, 283,369,382 pounds, valued at $1,558,531; mackerel, 47,898,798 pounds, valued at $725,834; and bluefin tuna, 6,213,842 pounds, valued at $410,913.

Catch by gear.—Three types of gear accounted for 99 per cent of the fishery products taken off the California coast and landed in San Pedro division during 1929. In order of their importance they were: Lampara nets, which accounted for 52 per cent of the catch; purse seines, 43 per cent; and lines, 4 per cent. The catch by lampara nets was principally pilchard or sardine and mackerel; that by purse seines principally pilchard or sardine, bluefin tuna, and mackerel; and that by lines chiefly mackerel, skipjack or striped tuna, and rockfishes.

OFF LATIN AMERICA

That part of the catch of the San Pedro division taken off the coast of Latin America amounted to 23,746,448 pounds, valued at $1,226,623. Considered according to value the more important species were: Yellowfin tuna, 11,911,883 pounds, valued at $634,685; skipjack or striped tuna, 6,791,701 pounds, valued at $247,886; and barracuda, 1,007,628 pounds, valued at $155,007.

Catch by gear.—Two types of gear accounted for 99 per cent of the fishery products taken off the coast of Latin America and landed in the San Pedro division during 1929. Of these, lines accounted for 61 per cent and purse seines 38 per cent. The catch by lines was principally yellowfin tuna and skipjack or striped tuna, and that by purse seines principally yellowfin tuna, bonito, and barracuda.

Fisheries of the San Pedro division of the southern district of California, 1929

OPERATING UNITS: BY GEAR

Items	Purse seines			Lampara nets	Gill nets			Trammel nets
	Barracuda	Sardine	Tuna		Barracuda	Sea bass	Other	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	326	775	586	663	24	3	--------	32
On boats or shore	--------	--------	--------	101	100	52	26	63
Total	326	775	586	764	124	55	26	95
Vessels, motor	36	80	60	73	8	1	--------	12
Net tonnage	1,011	2,842	2,017	1,154	52	8	--------	83
Boats: Motor	--------	--------	--------	19	37	24	13	24
Apparatus:								
Number	36	80	60	92	45	25	14	36
Length, yards	15,696	32,906	34,638	37,160	--------	--------	--------	--------
Square yards	--------	--------	--------	--------	388,249	136,558	7,560	242,180

Items	Lines		Paranzella nets	Traps, lobster	Harpoons, swordfish	Shovels	Abalone outfits	Total, exclusive of duplication
	Set and hand	Troll						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	89	705	6	11	40	--------	--------	1,984
On boats or shore	351	329	30	125	21	69	4	818
Total	440	1,034	36	136	61	69	4	2,802
Vessels, motor	32	108	2	4	4	--------	--------	249
Net tonnage	325	2,902	33	29	131	--------	--------	6,335
Boats:								
Motor	248	227	10	73	13	--------	3	424
Other	17	9	--------	20	--------	1	--------	35
Apparatus:								
Number	1,287	2,345	6	2,349	17	69	3	--------
Yards at mouth	--------	--------	100	--------	--------	--------	--------	--------
Hooks	250,086	2,345	--------	--------	--------	--------	--------	--------

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	--------	--------	60,895	$1,048	--------	--------
Barracuda	1,403,994	$143,388	563,535	38,173	652,943	$56,296
Flounders:						
"California halibut"	143	20	569	89	27	4
Sole	150	9	--------	--------	--------	--------
Grayfish	160	4	8,966	285	48,539	1,719
Herring	--------	--------	--------	--------	325	10
Horse mackerel	184,772	4,306	456,449	11,664	10,337	434
Kingfish	582	9	298,539	5,761	531	12
Mackerel	2,406,491	26,085	38,509,743	577,345	171,532	3,235
Mullet	--------	--------	--------	--------	4,744	474
Perch	979	49	80,417	7,179	6,538	497
Pilchard or sardine	140,147,179	770,809	143,222,203	787,722	--------	--------
Pompano	--------	--------	1,920	962	94	43
Rock bass	8,879	679	40,550	2,969	3,172	214
Rockfishes	43	2	545	24	--------	--------
Sculpin	--------	--------	144	7	--------	--------
Sea bass:						
Black	6,737	623	2,655	199	2,907	166
White or squeteague	150,656	23,532	269,684	34,079	204,190	28,171
Sheepshead	--------	--------	70	3	578	30
Smelt	1,279	50	383,968	18,166	100,661	7,893
Tuna and tunalike fishes:						
Albacore	323	48	--------	--------	--------	--------
Bluefin	6,149,255	405,851	63,103	4,943	--------	--------
Bonito	75,891	2,633	216,469	7,239	40,427	1,258
Whitefish	455	32	--------	--------	43	4
Yellowtail	56,923	3,341	27,582	2,338	3,292	197
Other fish	1,259	59	44,931	1,700	3,440	150
Total	150,596,150	1,381,529	184,252,937	1,501,895	1,254,320	100,807
SHELLFISH						
Squid	4,229	320	83,343	3,750	--------	--------
Total	4,229	320	83,343	3,750	--------	--------
Grand total	150,600,379	1,381,849	184,336,280	1,505,645	1,254,320	100,807

Fisheries of the San Pedro division of the southern district of California, 1929—Continued

CATCH OFF CALIFORNIA: BY GEAR—continued

Species	Trammel nets		Lines			
			Set and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda			204	$19	425, 843	$31, 631
Flounders:						
"California halibut"	382, 357	$59, 125	18, 382	2, 365		
Sole	69, 535	2, 822	3, 680	249		
Other	1, 625	95	18, 285	4, 821		
Grayfish	84, 967	2, 971	54, 138	1, 708	97	4
Horse mackerel			7, 954	185		
Kingfish			16, 435	334		
"Lingcod"	387	23	3, 155	181		
Mackerel			5, 625, 591	101, 391	1, 185, 441	17, 778
Perch			14, 333	873		
Pompano			10	4	8	3
Rock bass	660	50	159, 690	10, 324	7, 191	633
Rockfishes	170	7	1, 612, 320	95, 388		
Sablefish			3, 427	198		
Sculpin	678	66	81, 194	8, 413		
Sea bass:						
Black	1, 307	57	49, 648	2, 937		
White or squeteague	3, 606	557	44, 930	6, 390	532	57
Sheepshead	3, 625	146	49, 010	2, 337		
Skates	16, 493	335	3, 435	76		
Smelt			3, 931	218		
Swordfish					25, 982	1, 256
Tuna and tunalike fishes:						
Albacore					179, 538	26, 931
Bluefin			606	54	878	65
Bonito			109	3	15, 891	550
Skipjack or striped tuna					4, 808, 441	208, 879
Yellowfin					150, 249	9, 516
Whitefish			106, 920	6, 829		
Yellowtail			416	33	19, 530	1, 198
Other fish	1, 260	94	44, 848	2, 662	928	47
Total	566, 670	66, 347	7, 922, 651	247, 992	6, 820. 549	298. 548
SHELLFISH						
Sea crawfish or spiny lobster	7, 327	1, 718				
Octopus			109	20		
Total	7, 327	1, 718	109	20		
Grand total	573, 997	68, 065	7, 922, 760	248, 012	6, 820, 549	298, 548

Species	Paranzella nets		Traps		Harpoons		Shovels		Abalone outfits	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Lbs.*	*Value*
Eels			317	$6						
Flounders:										
"California halibut"	275, 924	$31, 911								
Sole	138, 212	5, 672								
Grayfish	5, 072	174	55	2						
Perch			922	68						
Rock bass			101, 116	9, 395						
Rockfish	405	20								
Sculpin			266	27						
Sheepshead			204, 920	9, 761						
Skates	1, 575	17								
Swordfish					160, 841	$25, 520				
Whitefish			3, 955	349						
Other fish	130	2	250	14						
Total	421, 318	37, 796	311, 801	19, 622	160, 841	25, 520				
SHELLFISH										
Sea crawfish or spiny lobster	108	25	266, 369	64, 283						
Abalone									9, 505	$2, 562
Clams:										
Cockle							2, 283	$1, 125		
Pismo							25, 063	9, 275		
Octopus			321	34						
Total	108	25	266, 690	64, 317			27, 346	10, 400	9, 505	2, 562
Grand total	421, 426	37, 821	578, 491	83, 939	160, 841	25. 520	27, 346	10, 400	9, 505	2, 562

Fisheries of the San Pedro division of the southern district of California, 1929—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	1,001,803	$154,278	2,512	$386	206	$32
Flounders: "California halibut"	1,620	201	-----	-----	-----	-----
Grayfish	33	1	-----	-----	-----	-----
Horse mackerel	5,383	440	3,493	387	-----	-----
Mullet	720	72	17,308	1,779	-----	-----
Perch	14	1	664	45	-----	-----
Pompano	895	114	18,840	2,578	-----	-----
Rock bass	576	49	5,241	183	-----	-----
Rockfishes	1,241	112	-----	-----	-----	-----
Sea bass:						
Black	20,463	1,406	14,836	925	-----	-----
White or squeteague	170,055	14,761	28,850	2,914	48,651	6,219
Sheepshead	239	9	-----	-----	-----	-----
Smelt	567	51	-----	-----	-----	-----
Tuna and tunalike fishes:						
Bluefin	10,210	715	-----	-----	-----	-----
Bonito	2,104,683	71,848	1,033	41	-----	-----
Skipjack or striped tuna	635,626	17,544	-----	-----	-----	-----
Yellowfin	4,231,577	220,755	-----	-----	-----	-----
Whitefish	610	58	-----	-----	-----	-----
Yellowtail	806,570	45,289	57,425	6,213	452	18
Other fish	1,785	105	17,350	1,185	-----	-----
Total	8,994,670	527,809	167,552	16,636	49,309	6,269

Species	Trammel nets		Lines			
			Set and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	-----	-----	-----	-----	3,107	$311
Flounders:						
"California halibut"	37,478	$4,892	-----	-----	-----	-----
Sole	910	46	-----	-----	-----	-----
Horse mackerel	-----	-----	1,625	$195	-----	-----
Rock bass	-----	-----	4,243	171	-----	-----
Rockfishes	-----	-----	365	18	-----	-----
Sea bass: Black	392	35	11,200	560	-----	-----
Tuna and tunalike fishes:						
Bonito	-----	-----	-----	-----	174,388	6,777
Skipjack or striped tuna	-----	-----	-----	-----	6,156,075	230,342
Yellowfin	-----	-----	-----	-----	7,680,306	413,930
Whitefish	-----	-----	3,521	241	-----	-----
Yellowtail	-----	-----	5,368	322	379,786	13,500
Other fish	-----	-----	76,153	4,569	-----	-----
Total	38,780	4,973	102,475	6,076	14,393,662	664,860

SAN DIEGO DIVISION

The San Diego division is comprised of San Diego and Imperial Counties.

Operating units.—The catch of fishery products in the San Diego division was taken by 978 fishermen, 109 motor vessels, 165 motor and other small boats, and 7 major types of gear. The combined capacity of the vessels amounted to 3,800 net tons.

OFF CALIFORNIA

That part of the catch taken off the California coast of the San Diego division amounted to 22,301,494 pounds, valued at $708,792. Considered according to value the more important species were skipjack or striped tuna, 3,223,636 pounds, valued at $129,176; mackerel, 9,021,118 pounds, valued at $119,718; and rockfishes, 1,414,924 pounds, valued at $79,263.

Catch by gear.—Three types of gear accounted for 94 per cent of the fishery products taken off the coast of California and landed in the San Diego division during 1929. In the order of their importance they were: Lampara nets, which accounted for 45 per cent of the catch; lines, 43 per cent; and purse seines, 6 per cent. The catch by lampara nets was made up principally of mackerel and pilchard or sardine; that by lines was chiefly skipjack or striped tuna, mackerel, and rockfishes; and that by purse seines was almost exclusively bluefin tuna.

OFF LATIN AMERICA

That part of the catch of the San Diego division taken off the Latin America coast amounted to 40,878,609 pounds, valued at $2,415,982. Considered according to value the more important species were: Yellowfin tuna, 25,287,334 pounds, valued at $1,552,909; skipjack or striped tuna, 12,173,833 pounds, valued at $494,830; and sea crawfish or spiny lobster, 994,908 pounds, valued at $183,380.

Catch by gear.—Three types of gear accounted for 98 per cent of the catch of fishery products taken off the coast of Latin America and landed in the San Diego division. Lines accounted for 94 per cent of the catch, and traps and purse seines, each, 2 per cent. The catch by lines consisted principally of yellowfin tuna and skipjack or striped tuna; that by traps almost exclusively sea crawfish or spiny lobster; and that by purse seines principally yellowfin tuna.

Fisheries of the San Diego division of the southern district of California, 1929

OPERATING UNITS: BY GEAR

Items	Lampara nets	Gill nets			Trammel nets
		Barracuda	Sea bass	Other	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	144	14	14		14
On boats and shore	10	50	51	18	35
Total	154	64	65	18	49
Vessels, motor	28	4	4		4
Net tonnage	306	27	27		27
Boats:					
Motor	2	20	20	8	14
Other				6	
Apparatus:					
Number	30	24	24	15	18
Length, yards	7,860				
Square yards		234,452	115,900	18,225	242,798

Items	Lines		Traps, lobster	Harpoons, swordfish, and turtle	Shovels	Total, exclusive of duplication
	Set and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	122	666	41	81		706
On boats and shore	130	153	67	38	1	272
Total	252	819	108	119	1	978
Vessels, motor	27	100	10	15		109
Net tonnage	293	3,725	90	316		3,800
Boats:						
Motor	70	93	43	15		145
Other	5	5	8			20
Apparatus:						
Number	649	1,608	1,423	30	1	
Hooks	105,206	1,608				

Fisheries of the San Diego division of the southern district of California, 1929—Continued

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	13,850	$692	9,360	$635	237,066	$26,800		
Flounders:								
"California halibut"			208	32			100,923	$16,309
Grayfish					24,553	170	64,135	431
Herring					4,488	61		
Mackerel	9,940	124	6,102,847	77,750	38,206	774	651	11
Mullet					25,775	2,246		
Pilchard or sardine	44,515	245	3,884,868	25,494				
Pompano			217	25	39	16		
Rock bass			4,898	214	983	33	17	1
Rockfishes					10	1	234	10
Sculpin							235	21
Sea bass:								
Black			7,519	364	368	28	1,862	88
White or squeteague			13,318	1,372	91,478	12,160	305	60
Sheepshead			49	2			552	21
Skates							4,652	93
Smelt			3,734	143	12,644	1,297		
Tuna and tunalike fishes:								
Albacore	17	3						
Bluefin	1,235,554	73,708						
Bonito	65	2	70,248	1,992	36,431	1,026		
Yellowtail	22,948	803	8,147	385	64,781	2,930		
Total	1,326,889	75,577	10,105,413	108,408	536,822	47,542	173,566	17,045
SHELLFISH, ETC.								
Sea crawfish or spiny lobster							756	120
Grand total	1,326,889	75,577	10,105,413	108,408	536,822	47,542	174,322	17,165

Species	Lines				Traps		Harpoons		Shovels	
	Set and hand		Troll							
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	671	$39	618,504	$43,670						
Flounders:										
"California halibut"	3,951	298								
Sole	8,162	1,135								
Grayfish	42,925	265	615	3						
Kingfish	3,146	102								
Mackerel	1,687,473	25,575	1,182,001	15,484						
Perch	118	4			112	$6				
Rock bass	44,070	2,854	57,583	3,460	6,468	623				
Rockfishes	1,414,102	79,227			578	25				
Sculpin	25,280	2,578								
Sea bass:										
Black	87,850	4,217	3,240	194						
White or squeteague	58,605	7,456	9,571	1,215						
Sheepshead	10,566	468			15,224	688				
Smelt	294	16								
Swordfish							505,484	$62,172		
Tuna and tunalike fishes:										
Albacore			89,178	13,377						
Bluefish			26,974	2,180						
Bonito	1,089	35	136,356	3,331						
Skipjack or striped tuna			3,232,636	129,176						
Yellowfin			49,195	3,256						
Whitefish	76,227	3,844								
Yellowtail	2,393	178	643,933	28,462						
Other fish			288	14						
Total	3,466,922	128,291	6,040,975	243,822	22,382	1,342	505,484	62,172		
SHELLFISH, ETC.										
Sea crawfish or spiny lobster					122,214	24,464				
Clams, mixed									13	$5
Turtles							58	4		
Total					122,214	24,464	58	4	13	5
Grand total	3,466,922	128,291	6,040,975	243,822	144,596	25,806	505,542	62,176	13	5

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro section.

Fisheries of the San Diego division of the southern district of California, 1929—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	10,873	$1,848	5,816	$1,034	46,635	$5,130		
Flounders:								
"California halibut"	25	5	225	36			251,229	$35,353
Other			123	9				
Mackerel			740	23	54	2		
Mullet			16,047	943				
Pompano			2,913	248				
Rock bass			6,619	560	85	5		
Rockfishes							385	27
Sea bass:								
Black	150	6	17,901	1,082	14,179	783	17,134	857
White or squeteague	1,938	162	7,568	1,021	293,004	35,161	489	73
Sheepshead			75	4			43	2
Skates							234	5
Smelt			40	3	664	76		
Tuna and tunalike fishes:								
Bluefin	39,909	2,416						
Bonito	3,329	100	2,469	123	716	22		
Skipjack or striped tuna	25,754	786						
Yellowfin	572,531	23,712						
Yellowtail	31,086	932	32,280	3,305	8,089	404		
Other fish			813	84				
Total	685,595	29,967	93,629	8,475	363,426	41,583	269,514	36,317
SHELLFISH								
Sea crawfish or spiny lobster							715	110
Total							715	110
Grand total	685,595	29,967	93,629	8,475	363,426	41,583	270,229	36,427

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pound*	*Value*	*Pounds*	*Value*
Barracuda	95	$14	231,664	$25,701				
Flounders: "California halibut"	569	67						
Kingfish	51	2						
Mackerel			611	18				
Rock bass	11,379	895	2,315	97	16,801	$1,304		
Rockfishes	31,487	1,322	57	4				
Sea bass:								
Black	138,626	8,032	5,237	262				
White or squeteague	53,349	4,969	2,772	451				
Sheepshead	1,070	64			2,401	96		
Swordfish							774	$193
Tuna and tunalike fishes:								
Albacore			45	7				
Bluefin			368	30				
Bonito	70	2	37,970	1,101				
Skipjack or striped tuna			12,148,079	494,044				
Yellowfin			24,714,803	1,529,197				
Whitefish	9,301	468	693	28				
Yellowtail	606	41	903,657	40,059				
Other fish	152,054	7,512	2,475	105				
Total	398,657	23,388	38,050,746	2,091,104	19,202	1,400	774	193
SHELLFISH								
Sea crawfish or spiny lobster					994,193	183,270		
Turtles							2,158	175
Total					994,193	183,270	2,158	175
Grand total	398,657	23,388	38,050,746	2,091,104	1,013,395	184,670	2,932	368

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro section.

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—There were 56 persons in 1929 who were engaged in California in transporting the catch of fish. In this trade 1 steam vessel, 7 motor vessels, and 5 sailing vessels, having a combined capacity of 2,325 net tons, were operated.

Wholesale.—There were 61 wholesale establishments along the coast of California engaged primarily in the handling of fresh and frozen products. These establishments employed 812 persons who received $1,443,138 in salaries and wages.

Manufacturing.—There were 64 establishments in California during 1929 engaged primarily in the manufacture of prepared fishery products or by-products. They employed 6,976 persons who received $4,670,243 in salaries and wages. The products manufactured, consisting principally of canned sardines, dry-salted cod, and canned tuna and tunalike fishes were valued at $30,980,699. Detailed statistics of most of the items manufactured may be obtained from Fisheries Document No. 1095 "Fishery Industries of the United States, 1929."

Industries related to the fisheries of California, 1929

TRANSPORTING

Items	Number	Items	Number
Men on transporting vessels	56	Transporting vessels—Continued.	
Transporting vessels:		Sail	5
Steam	1	Net tonnage	1,818
Net tonnage	32	Total	13
Motor	7	Net tonnage	2,325
Net tonnage	475		

WHOLESALE

Items	San Francisco and northern districts	Monterey district	Southern district		Tota
			San Pedro division	San Diego division	
Establishments	17	13	23	8	61
Persons engaged:					
Proprietors	32	16	39	8	95
Salaried employees	73	16	35	10	134
Wage earners	336	78	122	47	583
Total	441	110	196	65	812
Paid to salaried employees	$237,007	$60,418	$165,367	$40,200	$502,992
Paid to wage earners	521,100	118,707	213,562	86,777	940,146
Total salaries and wages	758,107	179,125	378,929	126,977	1,443,138

Indusiries related to the fisheries of California, 1929—Continued

MANUFACTURING

Items	Number
Establishments	64
Persons engaged:	
Proprietors	95
Salaried employees	378
Wage earners	6, 503
Total	6, 976
Paid to salaried employees	$1, 004, 341
Paid to wage earners	3, 665, 902
Total salaries and wages	4, 670, 243

Products	Quantity	Value
Salted:		
Cod, dry-salted[1] ... pounds	1, 622, 000	$82, 510
Salmon, mild-cured ... do	951, 225	286, 000
Sardines ... do	352, 095	17, 148
Other ... do	184, 017	23, 553
Smoked ... do	325, 791	99, 348
Dried:		
Shrimp ... do	138, 097	16, 451
Other products ... do	541, 914	21, 677
Canned:		
Sardines ... standard cases[2]	3, 831, 215	11, 996, 997
Tuna and tunalike fishes do	1, 504, 306	9, 873, 453
Mackerel ... do	592, 451	2, 428, 058
Miscellaneous[3]		238, 445
By-products:		
Fish meal, scrap, and flour ... tons	45, 741	2, 414, 842
Fish and whale oils ... gallons	7, 240, 484	3, 220, 885
Miscellaneous[4]		261, 332
Total		30, 980, 699

[1] Cod were salted in Alaska waters.

[2] A standard case contains forty-eight 1-pound cans of sardines and mackerel, or forty-eight ½-pound cans of tuna and tunalike fishes.

[3] Includes canned salmon, shad, shad roe, barracuda fish cakes, abalone, squid, and fish for cat and dog food.

[4] Includes liquid glue, pilchard scales, kelp products, and crushed-shell products.

HISTORICAL REVIEW

Fifteen general surveys have been made for statistics of the fisheries of the Pacific Coast States during the 42 years from 1888 to 1929. The catch for 1888 amounted to 87,043,000 pounds. Since that time the catch has continued to increase, with the largest catch on record shown for 1929, when 1,034,434,000 pounds were taken. Comparative statistics for each of the more important species taken are shown in the following tables:

Fisheries of the Pacific Coast States, 1888 to 1929

SUMMARY: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Year	Washington		Oregon		California		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1888	20, 468	811	26, 048	734	40, 527	2, 465	87, 043	4, 010
1892	29, 935	932	28, 694	872	49, 447	3, 023	108, 076	4, 827
1895	54, 915	1, 402	38, 121	1, 284	42, 858	1, 787	135, 894	4, 473
1899	119, 340	2, 871	22, 752	856	64, 819	2, 552	206, 911	6, 279
1904	94, 121	2, 973	27, 536	1, 185	68, 958	2, 523	190, 615	6, 681
1908	111, 356	3, 513	28, 221	1, 356	53, 479	1, 970	193, 056	6, 839
1915	170, 594	5, 321	34, 693	1, 479	99, 509	2, 506	304, 796	9, 306
1922	70, 063	4, 954	22, 134	1, 256	195, 009	6, 774	287, 206	12, 984
1923	119, 083	7, 801	32, 883	3, 504	263, 775	7, 737	415, 741	19, 042
1924	97, 088	7, 123	39, 578	3, 204	351, 022	9, 725	487, 688	20, 052
1925	139, 457	9, 477	40, 008	3, 442	447, 560	11, 662	627, 025	24, 581
1926	98, 088	7, 943	32, 998	3, 068	406, 538	7, 904	537, 624	18, 915
1927	131, 134	9, 146	34, 195	3, 103	497, 184	10, 058	662, 513	22, 307
1928	88, 991	7, 501	27, 474	2, 686	588, 647	10, 326	705, 112	20, 513
1929	152, 224	9, 563	25, 284	2, 605	856, 926	12, 870	1, 034, 434	25, 038

NOTE.—Salt fish have been converted to the equivalent weight of fresh fish. All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

Fisheries of Washington, 1888 to 1929

CATCH

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1888	1892	1895	1899	1904	1908
FISH						
Catfish	------	------	------	106	6	------
Cod	239	1,684	1,428	2,906	6,475	14,525
Flounders:						
"Sole"	------	------	------	------	9	190
Other	------	185	107	28	199	284
Halibut	1,520	1,410	1,844	6,861	12,066	30,072
Herring	------	617	345	424	532	2,506
"Lingcod"	------	359	223	91	144	62
Rockfishes	------	163	38	72	83	132
Sablefish	------	15	37	164	334	168
Salmon:						
Blueback, red or sockeye	16,454	2,514	7,313	42,071	11,507	12,501
Chinook or king		9,844	12,937	10,938	15,212	12,336
Chum or keta		3,310	5,472	6,567	13,652	13,055
Humpback or pink		------	2,270	21,112	------	------
Silver or coho		3,597	12,384	20,649	26,021	14,080
Shad	------	103	------	85	125	100
Smelt	------	322	528	937	1,370	2,897
Steelhead trout	------	2,419	4,971	1,507	1,859	2,339
Sturgeon	------	544	1,884	90	129	185
Surf fishes	------	65	169	43	149	661
Tomcod	------	------	10	------	------	------
Other fish	1,135	40	30	49	78	------
Total	19,348	27,191	51,990	114,700	89,950	106,093
SHELLFISH, ETC.						
Crabs	2	79	163	275	723	2,179
Shrimp	5	2	36	20	430	247
Clams:						
Hard	300	684	1,405	3,131	775	155
Razor					133	234
Oysters:[1]						
Eastern, market	------	------	------	------	269	2,448
Native, market	813	1,979	1,297	1,180	1,833	
Mussels	------	------	24	19	------	------
Total	1,120	2,744	2,925	4,625	4,163	5,263
WHALE PRODUCTS						
Whale oil	------	------	------	15	------	------
Other whale products	------	------	------	------	8	------
Total	------	------	------	15	8	------
Grand total	20,468	29,935	54,915	119,340	94,121	111,356

Species	1915	1922	1923	1924	1925	1926	1927	1928	1929
FISH									
Carp	200	375	384	379	286	659	922	557	387
Catfish	------	------	1	------	------	------	------	------	------
Cod	17,203	3,675	11,503	11,566	12,897	12,428	8,087	9,016	13,532
Flounders:									
"Sole"	68	131	120	266	231	205	224	223	331
Other	26	85	196	188	261	140	98	124	105
Grayfish	------	------	------	------	------	------	90	3	286
Halibut	40,591	18,467	24,151	15,330	18,516	17,850	10,713	11,928	9,153
Herring	2,129	260	425	183	670	2,822	812	1,537	764
"Lingcod"	837	------	------	477	695	823	1,017	997	1,059
Perch	------	------	------	------	------	------	60	75	68
Rockfishes	101	[2] 361	[2] 579	295	443	443	477	617	514
Sablefish	576	1,022	2,226	1,895	2,442	2,212	2,784	2,335	2,075

[1] All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

[2] Includes fresh cod and "lingcod."

NOTE.—Salt fish have been converted to the equivalent weight of fresh fish.

Fisheries of Washington, 1888 to 1929—Continued

CATCH—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1915	1922	1923	1924	1925	1926	1927	1928	1929
FISH—continued									
Salmon:									
Blueback, red or sockeye	5, 043	5, 104	3, 664	5, 053	10, 212	3, 726	7, 814	4, 672	10, 275
Chinook or king	18, 188	10, 970	13, 217	24, 698	23, 756	19, 109	21, 238	17, 433	18, 959
Chum or keta	17, 156	6, 320	8, 791	12, 219	11, 493	13, 284	11, 147	17, 122	20, 500
Humpback or pink	29, 998	145	33, 097	498	35, 309	128	41, 370	1, 261	51, 450
Silver or coho	18, 630	14, 817	12, 950	16, 158	15, 195	15, 410	15, 643	13, 350	15, 561
Shad	96	48	89	193	255	380	326	515	491
Sharks	7, 493	6	59	97	42	290	--------	--------	--------
Skates	229	4	7	10	1	4	1	2	(3)
Smelt	2, 158	1, 392	1, 178	1, 441	1, 475	827	1, 334	1, 405	1, 486
Steelhead trout	2, 114	476	1, 401	1, 143	1, 719	2, 562	2, 167	1, 632	1, 658
Sturgeon	44	268	84	86	120	85	81	84	95
Surf fishes	15	51	54	44	80	70	--------	--------	--------
Tomcod	--------	--------	1	--------	--------	1	(3)	--------	5
Other fish	--------	[4] 2	--------	--------	--------	[4] 26	23	20	11
Total	162, 895	63, 979	114, 177	92, 219	136, 098	93, 484	126, 428	84, 908	148, 765
SHELLFISH, ETC.									
Crabs	1, 734	1, 172	1, 154	1, 146	952	1, 938	1, 711	1, 521	1, 319
Shrimp	386	62	35	38	36	51	39	36	50
Clams:									
Hard	176	92	80	203	222	215	250	215	193
Razor	373	949	381	524	893	1, 288	1, 859	1, 535	1, 058
Soft	1	--------	--------	--------	--------	--------	--------	--------	--------
Oysters: [1]									
Eastern, market	265	45	45	36	10	20	113	74	9
Native, market	815	555	682	651	663	698	616	615	609
Japanese, market	--------	35	10	16	28	60	--------	--------	66
Scallops	--------	--------	--------	4	6	210	11	18	67
Octopus	--------	20	52	105	106	124	102	63	88
Mussels	1	--------	--------	--------	--------	--------	--------	--------	--------
Squid	15	--------	--------	--------	--------	--------	--------	--------	--------
Trepang or sea cucumber	--------	--------	--------	--------	--------	--------	5	6	--------
Other shellfish	--------	--------	--------	--------	4	--------	--------	--------	--------
Total	3, 766	2, 930	2, 439	2, 723	2, 920	4, 604	4, 706	4, 083	3, 459
WHALE PRODUCTS									
Sperm oil	--------	261	347	68	87	--------	--------	--------	--------
Whale oil	2, 635	1, 763	1, 376	1, 472	142	--------	--------	--------	--------
Other whale products	1, 298	1, 130	744	606	210	--------	--------	--------	--------
Total	3, 933	3, 154	2, 467	2, 146	439	--------	--------	--------	--------
Grand total	170, 594	70, 063	119, 083	97, 088	139, 457	98, 088	131, 134	88, 991	152, 224

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[1] All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

[3] Less than 500 pounds.

[4] Includes cod tongues.

NOTE.—Salt fish have been converted to the equivalent weight of fresh fish.

Fisheries of Oregon, 1888 to 1929

CATCH

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1888	1892	1895	1899	1904	1908
FISH						
Carp	--------	--------	--------	--------	20	30
Catfish	--------	--------	99	54	180	201
Flounders:						
"Sole"	--------	--------	--------	--------	--------	--------
Other	--------	10	--------	4	--------	23
Halibut	--------	19	5	17	25	16
Herring	--------	--------	--------	19	18	15
"Lingcod"	--------	26	6	--------	--------	20
Rockfishes	--------	86	47	--------	21	5

NOTE.—Salt fish have been converted to the equivalent weight of fresh fish.

Fisheries of Oregon, 1888 to 1929—Continued

CATCH—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1888	1892	1895	1899	1904	1908
FISH—continued						
Salmon:						
Blueback, red or sockeye	24,481	3,140	566	579	334	403
Chinook or king		15,686	21,101	13,750	20,022	18,176
Chum or keta			2,125	790	999	905
Silver or coho		4,429	9,463	5,154	4,255	4,923
Shad	10	109	125	32	37	431
Smelt	180		31	28	25	30
Steelhead trout		2,587	3,220	1,104	1,104	2,469
Sturgeon	1,157	2,513	956		9	114
Surf fishes				6	4	26
Other fish	76				10	13
Total	25,904	28,605	37,744	21,537	27,063	27,800
SHELLFISH						
Crabs		4	24	111	246	200
Crawfish	14	20	59	116	187	178
Clams:						
Razor	75	50	281	979	31	
Hard						1
Soft						30
Oysters, native, market [1]	55	15	13	9	9	12
Total	144	89	377	1,215	473	421
Grand total	26,048	28,694	38,121	22,752	27,536	28,221

Species	1915	1922	1923	1924	1925	1926	1927	1928	1929
FISH									
Anchovies									3
Carp	50				63		68	13	
Flounders:									
"Sole"					2	1	1	(2)	25
Other	2		5			4			9
Hake									(2)
Halibut	235	239	864	511	578	363	372	426	516
Herring	12		94				54	(2)	151
"Lingcod"	13	21	78	52	59	16	68	62	264
Perch								3	94
Pilchard								(2)	30
Rockfishes	12	2	63	39	31	67	44	74	128
Sablefish	16	57	250	161	348	387	336	280	152
Salmon:									
Blueback, red or sockeye	337	936	2,065	436	353	805	237	152	327
Chinook or king	23,482	12,650	17,361	19,606	21,420	16,398	17,132	12,005	10,944
Chum or keta	1,982	128	1,136	2,998	2,338	812	3,679	5,244	2,222
Silver or coho	4,845	4,379	6,717	10,279	10,247	8,807	7,021	5,174	6,609
Shad	489	578	404	983	1,017	1,655	1,516	1,344	1,186
Smelt	4	217	277	227	309	73	412	19	50
Steelhead trout	2,366	1,821	2,856	3,605	2,307	2,657	2,196	1,814	1,548
Striped bass					6		2	13	12
Sturgeon	98	217	124	176	161	138	133	89	97
Surf fishes	12		15						
Tomcod	22		5						(2)
Tuna, albacore									(2)
Other fish	16	5							
Total	33,993	21,250	32,314	39,073	39,239	32,183	33,271	26,712	24,367
SHELLFISH									
Crabs	415	731	359	433	522	533	600	493	706
Crawfish	184	69	142	12	128	106	138	158	146
Clams:									
Razor	77	59	49	33	89	154	164	101	47
Hard				1		5			
Soft	22	14	5	15	20	14			9
Mixed							[3] 19	10	
Oysters, native, market [1]	2	11	14	11	10	3	3	(2)	9
Total	700	884	569	505	769	815	924	762	917
Grand total	34,693	22,134	32,883	39,578	40,008	32,998	34,195	27,474	25,284

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[1] All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

[2] Less than 500 pounds.

[3] Consisted mostly of soft clams.

NOTE.—Salt fish have been converted to the equivalent weight of fresh fish.

Fisheries of California, 1888 to 1929

CATCH

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1888	1892	1895	1899	1904	1908	1915	1918
FISH								
Albacore	--------	--------	299	179	210	--------	21,074	7,265
Anchovies	--------	150	460	7	--------	220	113	868
Barracuda	--------	436	1,245	1,425	2,375	3,205	3,923	4,838
Bonito	--------	421	301	189	212	329	448	2,441
Carp	--------	66	46	284	70	427	351	313
Catfish	--------	--------	277	466	737	1,069	517	205
Cod	--------	7,109	8,700	18,491	17,572	10,306	15,478	14,728
Flounders:								
"California halibut"	--------	--------	--------	--------	--------	--------	--------	[1] 4,754
"Sole"	--------	--------	--------	32	3,874	--------	5,762	7,028
Other	--------	4,270	3,308	4,715	4,361	[2] 6,681	6,934	2,574
Hake	--------	--------	--------	--------	--------	32	269	219
Halibut	--------	--------	--------	--------	--------	--------	--------	--------
Hardhead	--------	--------	--------	186	65	--------	73	28
Herring	--------	4,487	3,181	1,653	1,426	825	864	7.938
Kingfish	--------	40	148	127	174	682	656	975
"Lingcod"	--------	231	139	148	293	167	578	916
Mackerel	--------	350	95	168	135	197	266	4,076
Mullet	--------	--------	--------	22	13	4	3	91
Pilchard or sardine	--------	753	732	2,383	1,036	4,638	4,390	157,653
Pompano	--------	--------	11	13	34	89	19	24
Rock bass	--------	--------	--------	--------	--------	--------	901	784
Rockfishes	--------	1,839	1,529	1,188	1,820	2,319	4,352	7,890
Sablefish	--------	--------	--------	--------	--------	35	65	499
Salmon:								
Blueback, red or sockeye	--------	--------	--------	22	279	147	--------	--------
Chinook or king	--------	3,721	4,450	7,091	14,916	8,846	7,324	13,026
Chum or keta	--------	--------	--------	--------	--------	--------	38	--------
Silver or coho	--------	960	164	60	272	141	415	--------
Sculpin	--------	--------	--------	3	3	--------	9	28
Sea bass:								
Black	--------	263	37	96	63	161	392	249
White, or squeteague	--------		640	952	983	1,337	1,221	1,684
Shad	--------	520	247	1,138	327	1,169	6,893	2,384
Sharks	--------	--------	--------	--------	--------	--------	68	403
Sheepshead	--------	--------	--------	--------	--------	--------	--------	23
Skates	--------	--------	--------	--------	198	124	783	246
Skipjack, or striped tuna	--------	--------	--------	--------	--------	--------	--------	3,024
Smelt	--------	1,920	1,740	1,315	1,362	718	1,137	797
Steelhead trout	--------	310	461	114	55	76	32	22
Striped bass	--------	56	252	1,234	1,570	1,776	1,784	1,408
Sturgeon	--------	718	300	206	--------	10	18	--------
Surf fishes	--------	[3] 335	[3] 267	116	119	198	128	198
Swordfish	--------	--------	--------	--------	--------	8	--------	18
Tomcod	--------	--------	64	376	69	49	42	49
Tuna and tunalike fishes:								
Yellowfin	--------	--------	32	24	15	12	--------	--------
Mixed	--------	--------	--------	--------	--------	--------	--------	6,241
Whitebait	--------	--------	--------	--------	--------	--------	56	136
Whitefish	--------	--------	263	58	270	466	--------	--------
Yellowtail	--------	546	316	334	358	571	1,343	11,798
Other fish	28,736	2,217	583	674	1,266	1,201	673	859
Total	28,736	31,724	30,287	45,489	56,532	48,235	89,392	268,700
SHELLFISH, ETC.								
Crabs	230	2,862	2,565	3,677	5,111	1,702	1,414	1,619
Sea crawfish or spiny lobster	231	303	558	607	1,078	573	892	931
Shrimp	4,902	5,313	5,425	6,495	2,576	258	298	722
Clams:								
Cockle	--------	--------	--------	--------	--------	--------	--------	5
Pismo	--------	--------	--------	--------	--------	--------	--------	166
Soft	--------	--------	--------	--------	140	468	67	52
Mixed	2,396	2,497	1,583	2,171	96	132	66	19
Mussels	--------	2,880	488	364	28	68	19	8
Oysters: [4]								
Eastern, market	182	1,022	1,145	2,520	1,020	714	376	136
Native, market		294		540	386		11	6

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[1] Includes halibut.

[2] Includes "sole."

[3] Includes Sacramento perch.

[4] All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

Fisheries of California, 1888 to 1929—Continued

CATCH—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1888	1892	1895	1899	1904	1908	1915	1918
SHELLFISH, ETC.—continued								
Abalone	[5] 3, 606	[5] 405	[6] 126	369	[5] 825	1, 005	731	121
Octopus	[7] 244	[7] 375	2	--------	--------	--------	32	33
Scallops	--------	--------	--------	4	--------	--------	--------	--------
Squid	--------	--------	30	1, 869	754	110	6, 211	362
Other shellfish	--------	--------	--------	--------	--------	--------	--------	21
Total	11, 791	15, 951	11, 922	18, 616	12, 014	5, 030	10, 117	4, 202
WHALE PRODUCTS								
Sperm oil	--------	--------	--------	--------	--------	169	--------	--------
Whale oil	--------	1, 575	550	507	325	13	--------	23
Other whale products	--------	197	99	207	87	32	--------	--------
Total	--------	1, 772	649	714	412	214	--------	23
Grand total	40, 527	49, 447	42, 858	64, 819	68, 958	53, 479	99, 509	272, 925

Species	1919	1920	1921	1922	1923
FISH					
Anchovies	1, 610	570	1, 947	653	307
Barracuda	5, 825	8, 201	7, 625	6, 250	7, 201
Carp	261	134	102	67	149
Catfish	165	112	148	126	129
Cod	6, 519	7, 731	2, 516	5, 250	4, 369
Flounders:					
"California halibut"	[1] 4, 859	[1] 4, 445	[1] 3, 796	[1] 3, 403	[1] 2, 427
"Sole"	5, 529	3, 822	4, 871	7, 043	7, 086
Other	1, 148	1, 204	1, 078	1, 712	1, 874
Hake	133	142	90	75	79
Hardhead	49	13	76	18	10
Herring	4, 290	274	542	342	384
Kingfish	609	461	391	582	412
"Lingcod"	1, 063	688	426	568	467
Mackerel	2, 703	3, 048	2, 975	2, 496	3, 592
Mullet	9	18	29	31	74
Pilchard or sardine	153, 877	118, 521	59, 323	93, 400	159, 197
Pompano	61	30	17	16	33
Rock bass	450	210	364	316	357
Rockfishes	5, 333	5, 601	4, 688	4, 263	4, 950
Sablefish	335	781	1, 023	269	538
Salmon, chinook	13, 146	11, 134	7, 991	7, 235	7, 090
Sculpin	25	36	58	42	60
Sea bass:					
Black	185	148	127	97	227
White or squeteague	2, 520	2, 661	2, 643	2, 982	2, 520
Shad	1, 574	1, 410	863	1, 110	1, 285
Sharks	613	811	539	282	360
Sheepshead	18	15	24	18	32
Skates	253	89	60	121	134
Smelt	757	744	765	830	806
Steelhead trout	17	7	4	3	3
Striped bass	762	672	602	684	910
Surf fishes	191	181	243	238	326
Swordfish	18	13	15	23	12
Tomcod	31	37	42	32	42
Tuna and tunalike fishes:					
Albacore	13, 631	18, 877	15, 277	13, 232	12, 515
Bluefin	14, 991	10, 530	2, 032	2, 838	3, 301
Bonito	3, 504	873	321	929	1, 115
Skipjack, or striped tuna	6, 897	7, 957	1, 139	11, 862	11, 463
Yellowfin	348	1, 965	1, 238	7, 337	10, 837
Mixed	2, 461	5, 483	1, 553	692	662
Whitebait	6	1	5	84	68
Whitefish	27	14	29	30	40
Yellowtail	5, 005	2, 705	2, 491	3, 414	3, 980
Other fish	655	681	1, 359	280	237
Total	262, 463	223, 050	131, 447	181, 275	251, 660

[1] Includes halibut.
[5] Includes shells.
[6] Dried
[7] Includes squid

Fisheries of California, 1888 to 1929—Continued

CATCH—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1919	1920	1921	1922	1923
SHELLFISH, ETC.					
Crabs	1, 305	1, 221	801	860	1, 076
Sea crawfish or spiny lobster	1, 089	1, 190	1, 278	1, 017	1, 093
Shrimp	813	818	910	990	1, 113
Abalone	152	180	298	312	318
Clams:					
Cockle	3	2	2	4	5
Pismo	104	75	55	49	59
Soft	50	39	36	57	47
Mixed	10	12	9	5	4
Mussels	6	6	2	7	10
Octopus	21	71	56	99	110
Oysters: [4]					
Eastern, market	152	112	77	74	69
Native, market	14	9	1	----------	----------
Squid	3, 698	508	433	210	1, 180
Other shellfish	270	97	4	13	1
Total	7, 687	4, 340	3, 962	3, 697	5, 085
WHALE PRODUCTS					
Sperm oil	----------	13	9	38	16
Whale oil	3, 120	4, 425	1, 561	6, 863	4, 644
Other whale products	1, 500	2, 390	696	3, 136	2, 370
Total	4, 620	6, 828	2, 266	10, 037	7, 030
Grand total	274, 770	234, 218	137, 675	195, 009	263, 775

Species	1924	1925	1926	1927	1928	1929
FISH						
Anchovies	347	124	60	368	357	382
Barracuda	7, 129	8, 006	5, 022	6, 200	6, 452	5, 229
Carp	76	95	72	63	157	85
Catfish	352	366	257	371	458	506
Cod	9, 012	10, 675	11, 600	8, 584	8, 116	4, 915
Eels	----------	----------	----------	([8])	([8])	([8])
Flounders:						
"California halibut"	2, 576	2, 452	1, 431	1, 302	1, 188	1, 103
"Sole"	8, 835	8, 763	8, 650	10, 298	10, 280	11, 706
Other	2, 081	2, 551	1, 813	1, 468	1, 517	1, 634
Grayfish	----------	----------	----------	325	624	834
Hake	61	22	58	85	109	146
Halibut	133	162	257	570	376	751
Hardhead	19	24	44	33	62	55
Herring	436	866	454	1, 168	1, 140	958
Horse mackerel	----------	----------	----------	467	540	709
Kingfish	384	537	485	529	442	476
"Lingcod"	400	683	645	555	849	1, 164
Mackerel	3, 241	3, 522	3, 623	4, 741	35, 262	57, 975
Mullet	62	37	52	40	83	65
Perch	----------	----------	----------	263	237	311
Pilchard or sardine	242, 686	315, 295	286, 741	342, 275	420, 270	651, 772
Pompano	18	11	8	55	30	25
Rock bass	466	330	636	526	626	483
Rockfishes	4, 717	5, 454	7, 538	6, 377	6, 420	6, 035
Sablefish	933	722	183	992	917	1, 439
Salmon, chinook or king	10, 015	9, 526	6, 084	6, 512	4, 479	5, 045
Sculpin	109	226	108	114	100	109
Sea bass:						
Black	231	189	378	468	382	404
White or squeteague	1, 516	1, 920	2, 216	2, 273	1, 281	1, 562
Shad	1, 539	2, 440	903	4, 104	2, 089	1, 603
Sharks	393	372	507	----------	----------	----------
Sheepshead	24	49	139	159	373	288
Skates	131	183	233	263	459	428
Smelt	722	752	883	966	917	914
Splittail	----------	----------	----------	11	11	9
Squawfish	----------	----------	----------	8	4	3
Steelhead trout	87	----------	----------	----------	----------	----------
Striped bass	662	838	751	648	484	529
Stingray	----------	----------	----------	----------	3	----------
Suckers	----------	----------	----------	1	1	1

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[4] All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

[8] Less than 500 pounds.

Fisheries of California, 1888 to 1929—Continued

CATCH—Continued

[Expressed in thousands of pounds; that is, 000 omitted]

Species	1924	1925	1926	1927	1928	1929
FISH—continued						
Surf fishes	289	268	209			
Swordfish	32	27	46	130	426	693
Tomcod	43	15	4	1	12	16
Tuna and tunalike fishes:						
Albacore	17, 695	22, 207	2, 469	4, 579	283	269
Bluefin	3, 241	3, 804	6, 527	4, 899	13, 701	7, 527
Bonito	1, 038	867	3, 079	1, 717	2, 088	2, 919
Skipjack, or striped tuna	3, 781	14, 235	20, 995	33, 807	15, 815	26, 998
Yellowfin	3, 063	13, 238	12, 565	25, 934	32, 251	37, 399
Mixed	547	427	261			
Whitebait	122	71	86	134	135	243
Whitefish	273	222	368	313	222	202
Yellowtail	4, 714	3, 180	5, 023	4, 225	2, 683	3, 075
Other fish	377	253	482	207	196	603
Total	334, 608	436, 006	393, 945	479, 128	574, 907	839, 597
SHELLFISH, ETC.						
Crabs	1, 507	3, 234	3, 296	2, 960	3, 575	1, 793
Sea crawfish or spiny lobster	1, 027	1, 486	1, 175	1, 491	1, 077	1, 392
Shrimp	1, 551	1, 460	1, 432	1, 697	2, 281	3, 055
Abalone	449	471	412	563	421	694
Clams:						
Cockle	1		2	1	3	9
Pismo	73	81	69	33	31	27
Soft	41	44	41	25	25	17
Mixed	7	9	5	[9] 10	7	2
Mussels	8	4	1	3	(8)	(8)
Octupus	166	133	63	37	6	87
Oysters:[4]						
Eastern, market	53	57	61	56	73	44
Native, market					4	9
Squid	6, 831	1, 891	3, 136	6, 014	1, 352	4, 660
Terrapin					(8)	
Turtles					5	2
Total	11, 714	8, 870	9, 693	12, 890	8, 860	11, 791
WHALE PRODUCTS						
Sperm oil		49	37			
Whale oil	2, 932	1, 526	1, 980	5, 166	4, 880	5, 330
Other whale products	1, 768	1, 109	883			208
Total	4, 700	2, 684	2, 900	5, 166	4, 880	5, 538
Grand total	351, 022	447, 560	406, 538	497, 184	588, 647	856, 926

[4] All statistics for oysters are now shown in pounds of meats. In previous reports the data from 1888 to 1918 usually included the weight of the shells.

[8] Less than 500 pounds.

[9] Consisted mostly of soft clams.

NOTE.—Salt fish have been converted to the equivalent weight of fresh fish.

HALIBUT FISHERY OF THE PACIFIC COAST[5]

The halibut fishery of the Pacific coast, which is prosecuted both by United States (including Alaska) and Canadian vessels, ranks as one of the foremost fisheries of that section. In 1930 the total catch by vessels of both nationalities amounted to 49,408,000 pounds, valued at $4,974,000. This is a decrease of 11 per cent in quantity and 26 per cent in value as compared with the catch in 1929. The catch in 1930 was less than in any year during the 5-year perid, 1925–1929. Of the total catch in 1930, 83 per cent was taken by United States craft and 17 per cent by Canadian craft. Considered according to ports of landing, 51 per cent was landed at Canadian ports, 26 per cent at ports in the State of Washington, and 23 per cent at ports in Alaska. Prince Rupert, in British Columbia, accounted for the greater part of the Canadian landings due to its excellent rail facilities for transportation eastward and its close proximity to the fishing grounds.

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[5] To preclude the possibility of unwarranted comparison of figures given in this section with others for years previous to 1927, it should be explained that the figures as herein compiled differ from those published in separate reports for the Alaska fisheries and the Pacific Coast States. The difference lies principally in the fleet classifications as between Washington and Alaska, though there is reason to believe that the figures on landings also are not comparable with those previously published, due to variable practice in the inclusion of United States caught halibut landed at foreign ports as well as the possible duplication of figures. The present compilation is a complete résumé of the landings of the United States fleet for the year 1930 at all Pacific ports except those in Oregon and California, without omission or duplication. The fleet classification has been applied arbitrarily by including in the "Washington fleet" all vessels that land more than half of their catch in that State. All others were included in the "Alaska fleet." It has been necessary to use "hailing fares" for the weight of the landings at Seattle, Wash., and Prince Rupert, British Columbia, although the error therefrom is estimated to be less than 2 per cent. The Alaska data are based on actual weight of the fares. Halibut are landed heads on, but eviscerated.

UNITED STATES

Operating units.—In 1930 the halibut fleet of the United States (including Alaska) numbered 221 vessels that fished regularly for halibut. These vessels had a combined capacity of 5,387 net tons. They were manned by 1,435 fishermen and operated 8,049 skates of lines. In addition to the regular vessels, 80 other vessels and 80 boats landed halibut at times. These were manned by 637 fishermen and operated 2,806 skates of lines.

Catch.—The total weight of the catch as landed by all United States craft fishing for halibut amounted to 45,304,549 pounds, valued at $4,300,688. Of this amount, 90 per cent consisted of halibut, 7 per cent sablefish, 2 per cent "lingcod," and 1 per cent rockfishes. The regular halibut vessels accounted for 89 per cent of the total catch, while the vessels fishing incidentally and boats accounted for the remaining 11 per cent.

Halibut fishery of the Pacific coast, 1930

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

Items	Washington fleet	Alaska fleet	Total
Regular halibut vessels:			
Number	71	150	221
Net tonnage	1,531	3,856	5,387
Crew	403	1,032	1,435
Dories	71	150	221
Skates of lines	2,485	5,564	8,049
Vessels in other fisheries but landing one or more fares of halibut:			
Number	30	50	80
Net tonnage	626	473	1,099
Crew	173	309	482
Dories	19	35	54
Skates of lines	1,054	1,009	2,063
Regular halibut boats:			
Number	----------	11	11
Crew	----------	31	31
Skates of lines	----------	220	220
Boats in other fisheries but landing one or more fares of halibut:			
Number	4	65	69
Crew	6	118	124
Skates of lines	58	465	523

Halibut fishery of the Pacific coast, 1930—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Vlaue*
WASHINGTON FLEET								
Regular vessels:								
Halibut	6, 803, 888	$852, 113	748, 500	$74, 332	507, 663	$38, 850	8, 060, 051	$965, 295
Sablefish	2, 214, 500	101, 561			4, 008	140	2, 218, 508	101, 701
"Lingcod"	468, 675	17, 981					468, 675	17, 981
Rockfishes	390, 775	15, 431					390, 775	15, 431
Total	9, 877, 838	987, 086	748, 500	74, 332	511, 671	38, 990	11, 138, 009	1, 100, 408
Other vessels and boats:								
Halibut	1, 107, 326	136, 632	72, 000	7, 901	108, 287	7, 732	1, 287, 613	152, 265
Sablefish	353, 000	16, 962			400	12	353, 400	16, 974
"Lingcod"	236, 175	9, 629			498	15	236, 673	9, 644
Rockfishes	113, 575	4, 853			678	20	114, 253	4, 873
Total	1, 810, 076	168, 076	72, 000	7, 901	109, 863	7, 779	1, 991, 939	183, 756
ALASKA FLEET								
Regular vessels:								
Halibut	4, 580, 650	522, 828	15, 367, 100	1, 564, 451	8, 792, 255	656, 946	28, 740, 005	2, 744, 225
Sablefish	123, 800	5, 022	13, 500	550	237, 206	8, 596	374, 506	14, 168
"Lingcod"	62, 400	3, 840			390	10	62, 790	3, 850
Rockfishes	39, 000	1, 902			2, 723	73	41, 723	1, 975
Total	4, 805, 850	533, 592	15, 380, 600	1, 565, 001	9, 032, 574	665, 625	29, 219, 024	2, 764, 218
Other vessels and boats:								
Halibut	132, 700	15, 926	710, 600	73, 688	1, 973, 779	157, 561	2, 817, 079	247, 175
Sablefish	23, 800	1, 020			97, 033	3, 572	120, 833	4, 592
"Lingcod"	1, 200	46			770	20	1, 970	66
Rockfishes	1, 800	66			13, 895	407	15, 695	473
Total	159, 500	17, 058	710, 600	73, 688	2, 085, 477	161, 560	2, 955, 577	252, 306
BOTH FLEETS								
Regular vessels:								
Halibut	11, 384, 538	1, 374, 941	16, 115, 600	1, 638, 783	9, 299, 918	695, 796	36, 800, 056	3, 709, 520
Sablefish	2, 338, 300	106, 583	13, 500	550	241, 214	8, 736	2, 593, 014	115, 869
"Lingcod"	531, 075	21, 821			390	10	531, 465	21, 831
Rockfishes	429, 775	17, 333			2, 723	73	432, 498	17, 406
Total	14, 683, 688	1, 520, 678	16, 129, 100	1, 639, 333	9, 544, 245	704, 615	40, 357, 033	3, 864, 626
Other vessels and boats:								
Halibut	1, 240, 026	152, 558	782, 600	81, 589	2, 082, 066	165, 293	4, 104, 692	399, 440
Sablefish	376, 800	17, 982			97, 433	3, 584	474, 233	21, 566
"Lingcod"	237, 375	9, 675			1, 268	35	238, 643	9, 710
Rockfishes	115, 375	4, 919			14, 573	427	129, 948	5, 346
Total	1, 969, 576	185, 134	782, 600	81, 589	2, 195, 340	169, 339	4, 947, 516	436, 062
All vessels and boats:								
Halibut	12, 624, 564	1, 527, 499	16, 898, 200	1, 720, 372	11, 381, 984	861, 089	40, 904, 748	4, 108, 960
Sablefish	2, 715, 100	124, 565	13, 500	550	338, 647	12, 320	3, 067, 247	137, 435
"Lingcod"	768, 450	31, 496			1, 658	45	770, 108	31, 541
Rockfishes	545, 150	22, 252			17, 296	500	562, 446	22, 752
Grand total	16, 653, 264	1, 705, 812	16, 911, 700	1, 720, 922	11, 739, 585	873, 954	45, 304, 549	4, 300, 688

Halibut fishery of the Pacific coast, 1930—Continued

CATCH OF HALIBUT: BY UNITED STATES AND CANADIAN VESSELS AND BOATS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
WASHINGTON FLEET								
Regular halibut vessels	6,804	852	748	74	508	39	8,060	965
Other vessels or boats	1,107	137	72	8	108	8	1,287	153
Total	7,911	989	820	82	616	47	9,347	1,118
ALASKA FLEET								
Regular halibut vessels	4,581	523	15,367	1,564	8,792	657	28,740	2,744
Other vessels or boats	133	16	711	74	1,974	157	2,818	247
Total	4,714	539	16,078	1,638	10,766	814	31,558	2,991
COMBINED FLEETS								
Regular halibut vessels	11,385	1,375	16,115	1,638	9,300	696	36,800	3,709
Other vessels and boats	1,240	153	783	82	2,082	165	4,105	400
Total	12,625	1,528	16,898	1,720	11,382	861	40,905	4,109
British Columbia fleet			8,476	[1] 863	27	2	8,503	865
Grand total	12,625	1,528	25,374	2,583	11,409	863	49,408	4,974

[1] Estimated.

Halibut fishery of the Pacific coast, 1925–1930

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Landed in—							Total		Grand total
	Washington, by U. S. vessels	British Columbia			Alaska					
		By U. S. vessels	By Canadian vessels	Total	By U. S. vessels	By Canadian vessels	Total	By U. S. vessels	By Canadian vessels	
1925	9,685	22,390	7,731	30,121	10,038		10,038	42,113	7,731	49,844
1926	10,050	20,331	9,277	29,608	14,122		14,122	44,503	9,277	53,780
1927	11,789	18,258	10,076	28,334	15,052		15,052	45,099	10,076	55,175
1928	13,753	19,963	11,396	31,359	9,733	70	9,803	43,449	11,466	54,915
1929	12,439	20,249	8,960	29,209	13,834	8	13,842	46,522	8,968	55,490
1930	12,625	16,898	8,476	25,374	11,382	27	11,409	40,905	8,503	49,408

NOTE.—Statistics for Washington are furnished by the Seattle Halibut Exchange, those for British Columbia by the U. S. Consular Service and the Prince Rupert Halibut Exchange, and those for Alaska by bureau agents.

VESSEL FISHERIES AT SEATTLE, WASH.

During 1930, a total of 38,850,197 pounds of fishery products, valued at $3,462,304, were handled by Seattle wholesale dealers. This amount is exclusive of quantities received by transporting vessels or rail from Alaska or Canada. This represents a decrease of 2 per cent in quantity and 14 per cent in value as compared with the transactions during the previous year.

Of the total quantity handled, 16,562,185 pounds, valued at $1,703,083, were landed by fishing vessels, an increase of 2 per cent in quantity and a decrease of 15 per cent in value as compared with the previous year. The vessels made 1,234 trips to the fishing grounds.

during the year which is an increase of 106 trips over those in 1929. Halibut was the most important species taken by fishing vessels, accounting for 76 per cent of the catch. Sablefish accounted for 16 per cent; "lingcod," 5 per cent; and rockfishes, 3 per cent.

The catch by fishing vessels was taken off the Pacific coast from Oregon to Unalaska Island. Hecate Straits ranked as the most productive grounds, furnishing 33 per cent of the catch. Second in importance was Cape Flattery, which provided 27 per cent of the catch, while Portlock Bank ranked third, furnishing 10 per cent. The remainder of the catch was taken chiefly from fishing grounds west of longitude 145° W.

Most of the catch by fishing vessels was made during the nine months from March to November, inclusive, which is due to the closed season for taking halibut during the winter months. During the 9-month period of greatest catches, landings averaged about 1,800,000 pounds each month.

During 1930, 22,288,012 pounds of fishery products, valued at $1,759,221, were received by wholesale dealers from sources other than Alaska or Canada, or from vessels in the halibut fishery discussed above. Most of these were products taken in Puget Sound. This was 5 per cent less than the quantity received from similar sources in 1929 by Seattle wholesale dealers, and the value was 13 per cent less. The decrease in quantity was due to the smaller catch of humpback or pink salmon and consequently smaller quantities handled in the markets as 1930 was the "off" year for this species.

Of the total fishery products handled by wholesale dealers derived from sources other than the halibut fleet or from Alaska or Canada, salmon accounted for 85 per cent, and the remainder was largely crabs, herring, smelt, flounders, "lingcod," sablefish, and steelhead trout. During the six months from May to October inclusive, 84 per cent of the years' transactions of these products were handled.

Fishery products landed by United States fishing vessels at Seattle, Wash., 1930[1]

BY BANKS

Fishing grounds	Trips	Halibut				Sablefish	
		No. 1		No. 2			
West of 145° W. longitude	*Number*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Unalaska Island	1	41,500	$4,565	8,500	$754	----------	--------
Shumagin Island	6	211,000	24,943	75,000	6,580	----------	--------
Chirikof Island	16	454,500	56,894	182,500	16,915	----------	--------
Trinity Island	17	440,000	55,341	211,000	18,700	----------	--------
Albatross Bank	15	353,500	44,507	155,500	15,970	----------	--------
Portlock Bank	48	1,100,100	138,145	502,400	47,630	----------	--------
Cook Inlet	1	25,000	2,875	22,000	1,760	----------	--------
Cape Cleare	12	344,100	38,670	99,900	8,524	----------	--------
Middleton Island	2	43,000	4,811	15,000	1,100	----------	--------
North of Cape Ommaney							
Cape St. Elias	2	54,500	6,116	11,500	780	----------	--------
Yakutat Bank	29	546,700	63,924	171,800	14,076	9,500	$205
Cape Fairweather	12	251,400	31,241	103,100	10,635	5,500	272
Cape Spencer	5	117,000	14,256	47,000	4,750	----------	--------
South of Cape Ommaney							
Cape Ommaney	2	39,000	4,470	6,000	570	----------	--------
Coronation Island	6	56,600	7,581	16,000	1,680	2,400	84
Cape Addington	14	64,200	8,090	296,300	27,468	35,000	2,175
Dixon Entrance	12	112,200	15,417	69,300	6,965	28,000	1,515
Hecate Straits	501	2,588,350	373,969	2,267,750	241,486	289,800	14,699
Cape Flattery	510	793,655	121,513	626,930	72,250	2,114,300	95,994
Oregon coast	23	61,550	9,436	32,850	3,746	174,500	6,757
Total	1,234	7,697,855	1,026,764	4,920,330	502,339	2,659,000	121,701

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[1] Halibut fleet.

Fishery products landed by United States fishing vessels at Seattle, Wash., 1930—Continued

BY BANKS—Continued

Fishing grounds	"Lingcod"		Rockfishes		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
West of 145° W. longitude						
Unalaska Island					50, 000	$5, 319
Shumagin Island					286, 000	31, 523
Chirikof Island					637, 000	73, 809
Trinity Island					651, 000	74, 041
Albatross Bank					509, 000	60, 477
Portlock Bank					1, 602, 500	185, 775
Cook Inlet					47, 000	4, 635
Cape Cleare					444, 000	47, 194
Middleton Island					58, 000	5, 911
North of Cape Ommaney						
Cape St. Elias					66, 000	6, 896
Yakutat Bank					728, 000	78, 205
Cape Fairweather					360, 000	42, 148
Cape Spencer					164, 000	19, 006
South of Cape Ommaney						
Cape Ommaney					45, 000	5, 040
Coronation Island			4, 500	$225	79, 500	9, 570
Cape Addington	700	$25	4, 300	140	400, 500	37, 898
Dixon Entrance	200	6	1, 700	67	211, 400	23, 970
Hectate Straits	110, 450	3, 764	205, 350	6, 867	5, 461, 700	640, 785
Cape Flattery	621, 600	26, 661	308, 100	13, 770	4, 464, 585	330, 188
Oregon coast	13, 700	373	14, 400	381	297, 000	20, 693
Total	746, 650	30, 829	538, 350	21, 450	16, 562, 185	1, 703, 083

BY MONTHS

Month	Trips	Halibut				Sablefish	
		No. 1		No. 2			
	Number	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
January	19						
February	8	450	$108				
March	121	781, 770	109, 452	299, 030	$32, 769	53, 100	$2, 944
April	156	1, 202, 050	168, 323	614, 675	69, 404	41, 650	3, 093
May	155	929, 050	128, 853	653, 400	72, 033	70, 800	5, 369
June	151	863, 110	112, 591	679, 000	68, 250	453, 600	25, 364
July	115	819, 300	101, 994	850, 300	77, 746	238, 250	12, 154
August	149	971, 750	105, 686	680, 700	54, 768	568, 600	25, 193
September	109	512, 425	82, 958	384, 125	48, 966	497, 600	20, 548
October	134	677, 000	99, 342	374, 950	43, 398	565, 400	21, 842
November	106	940, 950	117, 457	384, 150	35, 005	170, 000	5, 194
December	11						
Total	1, 234	7, 697, 855	1, 026, 764	4, 920, 330	502, 339	2, 659, 000	121, 701

Month	"Lingcod"		Rockfishes		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
January	138, 000	$8, 619	68, 500	$4, 273	206, 500	$12, 892
February	25, 700	2, 139	13, 100	1, 119	39, 250	3, 366
March	81, 300	3, 788	29, 350	1, 496	1, 244, 550	150, 449
April	173, 275	5, 523	64, 375	3, 042	2, 096, 025	249, 385
May	93, 150	2, 918	63, 200	2, 383	1, 809, 600	211, 556
June	65, 100	1, 538	48, 000	1, 297	2, 108, 810	209, 040
July	31, 025	1, 061	61, 275	1, 871	2, 000, 150	194, 826
August	10, 550	211	79, 250	1, 636	2, 310, 850	187, 494
September	16, 000	816	38, 300	1, 550	1, 449, 350	154, 838
October	59, 100	2, 158	45, 200	1, 620	1, 721, 750	168, 360
November	27, 500	880	12, 250	407	1, 534, 850	158, 943
December	24, 950	1, 178	15, 550	756	40, 500	1, 934
Total	746, 650	30, 829	538, 350	21, 450	16, 562, 185	1, 703, 083

Fishery products landed by United States fishing vessels at Seattle, Wash., 1917 to 1930

Year	Halibut		Sablefish		"Lingcod"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1917	13,949,683	$1,625,409	2,430,105	$107,350	91,774	$3,119
1918	10,244,200	1,528,846	4,354,950	271,167	1,784,600	62,292
1919	11,100,720	1,422,519	1,553,600	74,290	723,000	24,433
1920	12,683,450	1,913,849	950,200	49,963	513,035	21,153
1921	11,481,000	1,335,658	1,519,400	63,685	463,300	16,391
1922	9,938,150	1,196,390	1,014,100	46,652	258,200	4,509
1923	7,804,990	1,188,878	2,108,600	123,514	194,100	4,355
1924	7,362,960	1,197,229	2,030,300	110,971	465,975	14,403
1925	9,685,050	1,403,167	2,340,200	160,499	691,550	21,343
1926	10,050,610	1,738,015	2,082,800	107,673	821,250	33,356
1927	11,795,150	1,786,815	2,425,900	159,209	973,670	40,294
1928	13,734,395	1,594,573	2,252,050	105,486	957,120	33,173
1929	12,359,170	1,791,767	2,251,410	137,892	1,069,700	41,352
1930	12,618,185	1,529,103	2,659,000	121,701	746,650	30,829

Year	Rockfishes		All other		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1917	59,382	$1,438	23,000	$1,486	16,553,994	$1,738,802
1918	620,770	22,899	87,175	2,449	17,091,695	1,887,653
1919	263,700	9,042	----------	----------	13,651,020	1,530,284
1920	208,765	7,794	----------	----------	14,355,450	1,992,759
1921	203,000	7,569	----------	----------	13,666,700	1,423,303
1922	121,600	2,271	----------	----------	11,332,050	1,249,822
1923	129,900	4,840	----------	----------	10,237,590	1,321,587
1924	206,775	7,354	----------	----------	10,066,010	1,329,957
1925	279,750	9,289	----------	----------	12,996,550	1,594,298
1926	398,950	16,720	18,000	913	13,371,610	1,896,677
1927	530,850	22,636	7,500	450	15,733,070	2,009,404
1928	575,450	21,292	29,000	1,435	17,547,015	1,755,959
1929	577,000	25,448	125	9	16,257,405	1,996,468
1930	538,350	21,450	----------	----------	16,562,185	1,703,083

Fishery products received by Seattle wholesale dealers, 1930 [1]

BY MONTHS

Species	January		February		March		April		May	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:										
Sockeye or red	--------	------	--------	------	--------	------	--------	------	9,176	$1,101
King or spring	51	$18	--------	------	4,516	$1,068	475,129	$94,749	934,305	113,677
Coho or silver	--------	------	--------	------	--------	------	2,118	191	28,816	2,386
Chum or keta	3,460	294	--------	------	--------	------	--------	------	30	2
Trout: Steelhead	4,833	870	16,988	$2,803	4,707	801	--------	------	17,021	2,042
Rockfishes	1,881	94	1,886	128	3,441	172	8,678	346	10,516	267
"Lingcod"	875	35	2,323	147	7,025	351	30,074	902	22,443	440
Tomcod	--------	------	1,453	29	295	6	1,056	21	2,900	79
Sablefish	199	12	--------	------	6,240	499	13,580	1,080	8,828	529
Flounders:										
"Sole"	37,764	1,510	47,316	2,864	18,707	748	39,919	1,409	33,968	1,184
Other	209	4	445	9	2,391	96	150	3	1,290	13
Herring	955	19	178,718	871	371,700	2,358	--------	------	--------	------
Shad	--------	------	--------	------	--------	------	6,206	895	--------	------
Smelt	9,478	1,164	57,600	864	28,636	509	150	15	13,325	2,398
Perch	253	15	105	5	2,406	128	2,431	97	--------	------
Sturgeon	--------	------	--------	------	--------	------	--------	------	894	107
Miscellaneous fish	--------	------	40	1	173	10	400	20	--------	------
Octopus	--------	------	30	1	281	17	30	2	273	3
Crabs	131,340	8,536	92,004	7,002	171,138	13,304	169,488	11,559	111,230	9,115
Total	191,298	12,571	398,908	14,724	621,656	20,067	749,409	111,289	1,195,015	133,343

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[1] This tabulation does not include fish received from Alaska or Canada, or vessels in the halibut fleet.

Fishery products received by Seattle wholesale dealers, 1930—Continued

BY MONTHS—Continued

Species	June		July		August		September	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Sockeye or red	2,180	$189	15,832	$2,359	51,234	$6,293	11,347	$811
King or spring	1,911,900	243,079	3,254,904	381,800	2,362,320	260,039	601,097	60,263
Coho or silver	287,103	23,305	446,094	35,050	1,231,373	94,762	1,372,187	100,241
Humpback or pink			1,238	36	6,919	180	521	20
Chum or keta	189	7	2,050	54	43,422	1,078	94,483	1,835
Trout:								
Steelhead	11,500	1,226	9,826	1,179	2,030	244	1,674	207
Dolly Varden			600	45	215	14		
Rockfishes	28,121	563	10,029	416	5,695	114	2,935	52
"Lingcod"	14,822	296	23,998	480	11,859	104	2,484	61
Tomcod			870	26	450	9	513	10
Sablefish	15,778	788			41,507	2,488	7,155	286
Flounders:								
"Sole"	18,905	501	22,152	763	25,227	538	29,919	747
Other	466	5	3,184	119	1,985	77	2,732	108
Halibut			16,572	1,657	28,462	2,016	2,860	202
Smelt	53,725	5,383	79,493	6,474	77,257	3,824	86,353	3,659
Perch	350	18	813	28	1,003	40	2,812	140
Sturgeon	258	31	899	90	2,397	239	347	35
Octopus	2,725	82	1,786	105	3,415	239	4,215	211
Crabs	102,124	8,108	100,870	7,473	95,546	7,601	19,470	1,513
Total	2,450,146	283,581	3,991,210	438,154	3,992,316	379,899	2,243,104	170,401

Species	October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Sockeye or red							89,769	$10,753
King or spring	34,301	$3,323	958	$96	2,495	$216	9,581,976	1,158,328
Coho or silver	1,136,223	80,380	94,701	5,927	32,166	2,387	4,630,781	344,629
Humpback or pink							8,678	236
Chum or keta	3,563,138	48,633	694,015	9,330	261,539	7,981	4,662,326	69,214
Trout:								
Steelhead	2,200	221	917	102	14,538	2,385	86,234	12,080
Dolly Varden							815	59
Rockfishes	922	39	1,238	43	11,913	543	87,255	2,777
"Lingcod"	969	29	430	14	25,113	801	142,415	3,660
Tomcod							7,537	180
Sablefish	1,050	42					94,337	5,724
Flounders:								
"Sole"	14,980	687	6,346	280	30,054	1,202	325,257	12,433
Other	6,200	123					19,052	557
Halibut	5,391	701					53,285	4,576
Herring					125	5	551,498	3,253
Shad							6,206	895
Smelt	37,318	1,651	18,237	846	34,820	1,598	496,392	28,385
Perch			8,245	309	4,400	167	22,818	947
Sturgeon	560	56					5,355	558
Miscellaneous fish							613	31
Octopus	3,210	160	7,537	375	3,438	113	26,940	1,308
Crabs	148,324	8,814	117,453	7,714	129,486	7,899	[2]1,388,473	98,638
Total	4,954,786	144,859	950,077	25,036	550,087	25,297	22,288,012	1,759,221

[2] 63,112 dozen.

Fishery products received by Seattle wholesale dealers, 1917 to 1930

Year	Salmon		"Lingcod"		Flounders		Herring		Smelt	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1917	10,869,193	$935,915	37,320	$753	63,907	$1,660	1,211,224	$6,393	211,799	$13,004
1918	8,929,745	811,028	18,710	701	217,475	7,583	580,200	11,853	121,850	7,019
1919	10,387,703	902,717	55,860	2,606	204,140	6,585	46,000	600	296,041	14,723
1920	7,911,820	765,145	44,904	2,324	214,985	6,195	345,100	5,714	521,201	29,795
1921	10,349,700	679,171	32,000	1,650	313,580	8,810	560,000	4,340	370,805	24,081
1922	13,615,780	882,481	8,000	160	257,600	7,362	261,890	3,158	192,350	16,795
1923	15,711,200	1,209,855	47,300	2,998	302,200	9,999	218,000	1,900	229,500	22,284
1924	16,313,010	1,290,093	51,110	1,678	351,050	11,481	316,600	2,871	318,600	24,622
1925	15,331,500	1,263,748	106,000	4,852	373,950	15,143	589,000	3,965	201,500	18,020
1926	16,979,700	1,613,598	48,000	1,840	362,900	12,978	761,000	4,585	160,000	16,870
1927	13,790,900	1,158,800	49,700	1,644	441,400	16,443	704,000	4,315	202,500	22,560
1928	13,407,313	1,299,562	37,500	1,070	366,400	11,576	1,624,000	9,320	219,000	26,225
1929	21,116,059	1,903,971	111,045	3,881	296,872	14,219	547,245	3,110	141,929	20,003
1930	18,973,530	1,583,160	142,415	3,660	344,309	12,990	551,498	3,253	496,392	28,385

Fishery products received by Seattle wholesale dealers, 1917 to 1930—Continued

Year	Sablefish		Crabs		All other		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1917			71, 632	$5, 582	356, 278	$25, 252	12, 821, 353	$988, 559
1918	3, 700	$142	139, 821	10, 368	593, 822	63, 904	10, 605, 323	912, 598
1919			239, 758	21, 866	579, 948	34, 722	11, 809, 450	983, 819
1920			456, 494	40, 818	319, 462	31, 075	9, 813, 956	881, 066
1921			504, 300	37, 285	298, 140	23, 541	12, 428, 525	778, 878
1922			477, 560	33, 370	270, 210	21, 506	15, 083, 390	964, 832
1923			539, 278	37, 368	340, 000	24, 327	17, 387, 478	1, 308, 731
1924			505, 600	34, 490	310, 740	24, 030	18, 166, 710	1, 389, 265
1925			544, 600	38, 188	251, 360	17, 603	17, 397, 910	1, 361, 519
1926			446, 820	29, 245	288, 400	22, 948	19, 046, 820	1, 702, 064
1927			300, 540	20, 505	293, 360	27, 060	15, 782, 400	1, 251, 327
1928			272, 720	19, 450	299, 440	24, 200	16, 226, 373	1, 391, 403
1929	363, 788	23, 746	608, 029	41, 105	228, 711	22, 571	23, 413, 678	2, 032, 606
1930	94, 337	5, 724	1, 388, 473	98, 638	297, 058	23, 411	22, 288, 012	1, 759, 221

LAKE FISHERIES[6]

UNITED STATES AND CANADA

In 1929 the total catch of the lake fisheries of the United States and Canada amounted to 114,826,907 pounds. This represents an increase of 24 per cent as compared with the catch in 1928.[6] Of the total catch, that part taken in the United States amounted to 85,389,467 pounds, valued at $6,787,750. This represents 74 per cent of the total catch of the lake fisheries. It is an increase of 35 per cent as compared with the catch in 1928. The Canadian catch, which amounted to 29,437,440 pounds, shows a decrease of less than one-half of 1 per cent as compared with the catch in the previous year.

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[6] The most recent complete statistical canvass made by the bureau for the American catch in the lake fisheries (Lakes Ontario, Erie, Huron, Michigan, Superior, St. Clair, Kabetogama, Namakan, and Sand Point, Lake of the Woods, and Rainy Lake) was for the year 1922. The statistics collected in this canvass are published in condensed form in Bureau of Fisheries Statistical Bulletin No. 618 and in full in the report of the division of fishery industries for 1923.

The statistics of the catch presented herewith for 1929 were obtained mainly from the various State fisheries agencies and Dominion of Canada reports while statistics of the operating units (fishermen, vessels, boats, and gear) actually fished in 1929 were obtained by the bureau in a special canvass. In this latter canvass the catch, segregated as to method of taking, was not ascertained.

The statistics for 1929 are not strictly comparable with those for previous years in every instance as the catch of crawfish and mussels, pearls and slugs taken in mussel-bearing streams tributary to Lake Michigan and Lake Huron was included in the 1929 survey. Similarly, the statistics obtained for Wisconsin for 1929 are not strictly comparable with previous years due to a different and more complete method of collection utilized in 1929.

Statistics in the tables for the years 1913 to 1929 are for Lakes Ontario, Erie, Huron, Michigan, Superior, Namakan, Lake of the Woods, and Rainy Lake. Those for the years 1913 to 1924 were obtained in a survey of the lake fisheries made by the U. S. Tariff Commission, while those for the years 1925 to 1929, inclusive, were compiled and supplemented by the bureau from State statistics. To complete the data for the various lakes there have been included statistics of the Canadian lake fisheries for the years 1913 to 1929, which were obtained from official reports of the Dominion of Canada. The statistics shown for the years 1913 to 1925 are exclusive of the production of Illinois. The disparity resulting from the noninclusion of the production of Illinois is negligible. The production of Indiana from 1913 to 1925 has been estimated. The statistics from 1926 to 1929, inclusive, of the fisheries of these two States were collected by the bureau, which permits of their inclusion with the statistics collected by New York, Pennsylvania, Ohio, Michigan, Wisconsin, and Minnesota.

In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for two seasons. For Lake of the Woods the seasons are from June 1 to November 1 and December 1 to April 1, and for Rainy and Namakan Lakes from May 15 to November 1 and December 1 to April 1. The catch for these two seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between January 1 and April 1 amounted to less than 3 per cent of the total catch of these lakes in 1927.

CATCH

By species.—The statistics of the catch in the United States and Canada in 1929 show that the lake herring ranked first in quantity of production among species of fish taken in the lake fisheries. The catch in 1929 amounted to 25,601,722 pounds, which is 22 per cent of the total production for all the lake fisheries. This represents an increase of 35 per cent as compared with the catch of the previous year. The catch of lake herring in the United States accounted for 82 per cent of the total. Lake trout ranked second in importance with a catch of 17,988,095 pounds and represents 16 per cent of the total production. The catch shows an increase of 14 per cent as compared with that in the previous year. About 66 per cent of the trout were taken in the waters of the United States. Common whitefish ranked third in importance with a catch of 14,572,564 pounds, or 13 per cent of the total. This is an increase of 35 per cent as compared with the catch of the previous year. About 70 per cent of the catch was taken in United States waters. The catch of yellow perch, 58 per cent of which was taken in the waters of the United States, amounted to 13,917,725 pounds. This is an increase of 34 per cent as compared with the catch in 1928. The catch of blue pike, about 53 per cent of which was taken in the waters of the United States, amounted to 5,386,707 pounds. This is a decrease of 23 per cent as compared with the catch in 1928. The catch of cisco in Lake Erie, amounted to only 488,874 pounds in 1929. About 74 per cent of the catch was made in Canadian waters. The catch of this species represents a decrease of 74 per cent as compared with the previous year, and a large decrease as compared with the catches of this fish that were formerly made on Lake Erie.

By lakes.—Statistics of the production in the United States and Canada in 1929, by lakes, show that Lake Michigan ranked as the most important, with a catch of 35,614,571 pounds. This is an increase of 98 per cent as compared with the catch in the previous year. Lake Erie ranked second in importance, the catch amounting to 29,906,772 pounds. This is a decrease of less than one-half of 1 per cent as compared with the catch in the previous year. Lake Superior ranked third, with a catch amounting to 22,004,794 pounds. This is an increase of 19 per cent as compared with the catch in the previous year. The catch of Lake Huron amounted to 17,933,347 pounds, which is an increase of 1 per cent as compared with that in the previous year. The catch in Lake Ontario amounted to 4,638,696 pounds, which is an increase of 4 per cent as compared with the previous year. The catch in Lake of the Woods, Rainy Lake, and Namakan Lake amounted to 4,728,727 pounds, which is an increase of 18 per cent as compared with that in the previous year.

Lake Fisheries of the United States and Canada, 1929

CATCH: BY LAKES

Species	Lake Ontario			Lake Erie		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	14, 181	13, 600	27, 781	2, 820, 426	2, 538, 200	5, 358, 626
Bowfin	4, 611	(1)	4, 611	4, 114	(1)	4, 114
Buffalofish				1, 380	(1)	1, 380
Burbot	92, 295	(1)	92, 295	364, 127	(1)	364, 127
Carp	23, 905	89, 400	113, 305	979, 690	194, 600	1, 174, 290
Catfish and bullheads	48, 054	122, 600	170, 654	305, 034	116, 900	421, 934
Chubs		1, 900	1, 900			
Cisco				127, 874	361, 000	488, 874
Eels	59, 604	74, 600	134, 204	3, 507		3, 507
Goldfish				10, 380	(1)	10, 380
Lake herring	415, 590	1, 394, 400	1, 809, 990			
Lake trout	62, 247	555, 700	617, 947	1, 041	3, 200	4, 241
Mooneye				12, 856	(1)	12, 856
Pike (jacks)	9, 022	128, 600	137, 622	6, 465	30, 500	36, 965
Rock bass				817	(1)	817
Sauger pike				1, 543, 429	(1)	1, 543, 429
Sheepshead				2, 959, 468	(1)	2, 959, 468
Smelt	221	(1)	221		(1)	
Sturgeon	2, 038	3, 000	5, 038	2, 328	28, 173	30, 501
Sucker "mullet"	62, 368	(1)	62, 368	1, 296, 111	(1)	1, 296, 111
Sunfish	8, 762	(1)	8, 762	249	(1)	249
White bass				155, 327	(1)	155, 327
Whitefish, common	97, 489	843, 100	940, 589	1, 078, 978	1, 267, 500	2, 346, 478
Yellow perch	36, 387	154, 600	190, 987	6, 043, 712	5, 689, 200	11, 732, 912
Yellow pike	11, 022	31, 800	42, 822	929, 386	135, 000	1, 064, 386
Miscellaneous		277, 600	277, 600		895, 800	895, 800
Total	947, 796	3, 690, 900	4, 638, 696	18, 646, 699	11, 260, 073	29, 906, 772

Species	Lake Huron			Lake Michigan	Lake Superior		
	United States	Canada	Total	United States	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike		300	300				
Bowfin	23, 001	(1)	23, 001	54			
Buffalofish				282			
Burbot	1, 821	(1)	1, 821	33, 568	53	(1)	53
Carp	388, 143	71, 200	459, 343	607, 840	1, 017	1, 100	2, 117
Catfish and bullheads	214, 460	4, 700	219, 160	65, 548	105	200	305
Chubs	316, 132	308, 100	624, 232	4, 448, 815	570, 063	2, 700	572, 763
Lake herring	2, 657, 707	582, 800	3, 240, 507	5, 249, 140	12, 776, 285	2, 525, 800	15, 302, 085
Lake trout	1, 699, 057	3, 715, 100	5, 414, 157	6, 937, 823	3, 249, 343	1, 746, 600	4, 995, 943
Mooneye	2, 895	(1)	2, 895				
Pike (jacks)	43, 739	145, 300	189, 039	62, 795	16, 652	6, 700	23, 352
Rock bass	9, 161	(1)	9, 161	28, 702			
Sauger pike	29, 574	(1)	29, 574	11, 565	9, 333	(1)	9, 333
Sheepshead	15, 571	(1)	15, 571	1, 360			
Sturgeon		25, 547	25, 547	1, 296		1, 300	1, 300
Sucker "mullet"	1, 584, 770	(1)	1, 584, 770	2, 493, 662	236, 896		236, 896
Sunfish					50	(1)	50
White bass				339			
Whitefish:							
Common	2, 178, 534	1, 590, 100	3, 768, 634	6, 489, 031	208, 531	389, 300	597, 831
Menominee	109, 251	(1)	109, 251	388, 177	35, 530	(1)	35, 530
Yellow perch	525, 097	49, 300	574, 397	1, 372, 678	4, 556	200	4, 756
Yellow pike	578, 187	363, 300	941, 487	55, 175	39, 780	92, 700	132, 480
Crawfish				52, 200			
Mussels	100, 000		100, 000	7, 314, 521			
Miscellaneous		600, 500	600, 500			90, 000	90, 000
Total	10, 477, 100	7, 456, 247	17, 933, 347	35, 614, 571	17, 148, 194	4, 856, 600	22, 004, 794

[1] Where there has been a Canadian catch of these species it is included under "Miscellaneous."

Lake Fisheries of the United States and Canada, 1929—Continued

CATCH: BY LAKES—Continued

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Burbot	12, 000	(1)	12, 000	52, 700	(1)	52, 700
Chubs	216, 300		216, 300	50, 129		50, 129
Crappie	1, 920		1, 920			
Pike (jacks)	34, 168	2, 800	36, 968	71, 821	209, 195	281, 016
Sauger pike				900	(1)	900
Sturgeon	54	720	774	606	664	1, 270
Sucker "mullet"	14, 555	(1)	14, 555	10, 080	(1)	10, 080
Tullibees		7, 430	7, 430		154, 770	154, 770
Whitefish, common	26, 631	10, 780	37, 411	38, 319	77, 873	116, 192
Yellow perch	303		303	4, 993	9, 548	14, 541
Yellow pike	29, 208	9, 545	38, 753	61, 553	216, 041	277, 594
Miscellaneous					20, 120	20, 120
Total	335, 139	31, 275	366, 414	291, 101	688, 211	979, 312

Species	Lake of the Woods			Total all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike				2, 834, 607	2, 552, 100	5, 386, 707
Bowfin				31, 780	(1)	31, 780
Buffalofish				1, 662	(1)	1, 662
Burbot	55, 219	(1)	55, 219	611, 783	(1)	611, 783
Carp	16, 925	2, 975	19, 900	2, 017, 520	359, 275	2, 376, 795
Catfish and bullheads	48, 595	75, 939	124, 534	681, 796	320, 339	1, 002, 135
Chubs				5, 601, 439	312, 700	5, 914, 139
Cisco				127, 874	361, 000	488, 874
Crappie	620	(1)	620	2, 540	(1)	2, 540
Eels				63, 111	74, 600	137, 711
Goldeye	220	(1)	220	220	(1)	220
Goldfish				10, 380	(1)	10, 380
Lake herring				21, 098, 722	4, 503, 000	25, 601, 722
Lake trout	49	17, 935	17, 984	11, 949, 560	6, 038, 535	17, 988, 095
Mooneye				15, 751	(1)	15, 751
Pike (jacks)	255, 679	413, 456	669, 135	500, 341	936, 551	1, 436, 892
Rock bass				38, 680	(1)	38, 680
Sauger pike	40, 895	(1)	40, 895	1, 635, 696	(1)	1, 635, 696
Sheepshead				2, 976, 399	(1)	2, 976, 399
Smelt				221	(1)	221
Sturgeon	768	936	1, 704	7, 090	60, 340	67, 430
Sucker "mullet"	216, 460	(1)	216, 460	5, 914, 902	(1)	5, 914, 902
Sunfish				9, 061	(1)	9, 061
Tullibees	573, 679	38, 262	611, 941	573, 679	200, 462	774, 141
White bass				155, 666	(1)	155, 666
Whitefish:						
Common	14, 331	262, 067	276, 398	10, 131, 844	4, 440, 720	14, 572, 564
Menominee				532, 958	(1)	532, 958
Yellow perch	25, 470	1, 681	27, 151	8, 013, 196	5, 904, 529	13, 917, 725
Yellow pike	679, 957	468, 072	1, 148, 029	2, 384, 268	1, 316, 458	3, 700, 726
Crawfish				52, 200		52, 200
Mussels				7, 414, 521		7, 414, 521
Miscellaneous		172, 811	172, 811		2, 056, 831	2, 056, 831
Total	1, 928, 867	1, 454, 134	3, 383, 001	85, 389, 467	29, 437, 440	114, 826, 907

[1] Where there has been a Canadian catch of these species it is included under "Miscellaneous."

UNITED STATES

OPERATING UNITS

In conducting the survey of the operating units employed in the lake fisheries for 1929 an effort was made to determine the actual number of men, boats, and amount of gear employed in the fisheries. In making this determination only the average number of units of gear actually fishing simultaneously were counted, and those units being dried on shore, carried on the boats, or held in reserve were disregarded.

Fishermen.—There were 7,159 fishermen employed in the lake fisheries during 1929. Of this number 75 per cent were engaged in the boat and shore fisheries and 25 per cent in the vessel fisheries. Forty-four per cent fished on Lake Michigan, 20 per cent on Lake Erie, 17 per cent on Lake Superior, 14 per cent on Lake Huron, 3 per cent on Lake Ontario, and 2 per cent on Lake of the Woods, Rainy Lake, and Namakan Lake.

Vessels.—During 1929 there were 122 steam vessels and 378 motor vessels engaged in the lake fisheries of the United States. Of this number, 46 per cent of the steam vessels and 70 per cent of the motor vessels were engaged in fishing on Lake Michigan, 26 per cent of the steam vessels and 8 per cent of the motor vessels on Lake Erie, 16 per cent of the steam vessels and 11 per cent of the motor vessels on Lake Huron, 12 per cent of the steam vessels and 10 per cent of the motor vessels on Lake Superior. Only 2 motor vessels were operated on Lake Ontario, and none on the remaining lakes.

Boats.—There were 2,078 motor boats and 1,401 other small boats employed in the lake fisheries during 1929. Of this number, 45 per cent of the motor boats and 34 per cent of the other boats were engaged on Lake Michigan, 19 per cent of the motor boats and 27 per cent of the other boats on Lake Superior, 15 per cent of the motor boats and 21 per cent of the other boats on Lake Erie, 14 per cent of the motor boats and 9 per cent of the other boats on Lake Huron, 4 per cent of the motor boats and 8 per cent of the other boats on Lake Ontario, and 3 per cent of the motor boats and less than one-half of 1 per cent of the other boats on Lake of the Woods, Rainy Lake, and Namakan Lake.

Gill nets.—During 1929 an average number of 108,557 gill nets were used in the lake fisheries. These nets had a total area, as fished, of 27,715,735 square yards, or almost 9 square miles. Of this number, 53 per cent were fished on Lake Michigan, 21 per cent on Lake Erie, 14 per cent on Lake Superior, 9 per cent on Lake Huron, 2 per cent on Lake Ontario, and 1 per cent on Lake of the Woods, Rainy Lake, and Namakan Lake.

Pound nets.—There were 1,694 pound nets used in the lake fisheries during 1929. Of this total, 47 per cent were used on Lake Huron, 40 per cent on Lake Michigan, 5 per cent on Lake Superior, 5 per cent on Lake of the Woods, Rainy Lake, and Namakan Lake, and 3 per cent on Lake Erie.

Trap nets.—There were 6,893 trap nets fished during 1929. Of this number, 65 per cent were fished on Lake Erie, 26 per cent on Lake Huron, 5 per cent on Lake Michigan, 3 per cent on Lake Ontario, and 1 per cent on Lake Superior.

Fyke nets.—There were 2,411 fyke nets fished during 1929. Of this number, 54 per cent were fished on Lake Erie, 25 per cent on Lake Michigan, 12 per cent on Lake Huron, 5 per cent on Lake of the Woods, Rainy Lake, and Namakan Lake, 3 per cent on Lake Ontario, and 1 per cent on Lake Superior.

Hooks.—There were 592,080 hooks fished on the Great Lakes during 1929. This includes 25 trolling hooks used on Lake Superior and 9 on Lake Michigan. Fifty-four per cent of the total number of hooks were fished on Lake Michigan, 30 per cent on Lake Superior, 12 per cent on Lake Huron, 3 per cent on Lake Ontario, and 1 per cent on Lake Erie.

Seines.—During 1929 there were 290 seines used in the lake fisheries. These had an aggregate length of 159,881 yards. Of the total number, 57 per cent were fished on Lake Erie, 23 per cent on Lake Huron, 18 per cent on Lake Michigan, 1 per cent on Lake Superior, and only 1 seine on Lake Ontario.

CATCH

Michigan, with frontage on Lakes Erie, Huron, Michigan, and Superior, ranked first in importance in the lake fisheries of the United States in 1929. The catch in the waters of this State amounted to 33,373,135 pounds, valued at $3,248,088. This is 39 per cent of the total catch of the Lakes, produced in the United States, and 48 per cent of the total value. Wisconsin, with fisheries on Lakes Michigan and Superior, ranked second with a catch of 20,163,221 pounds, valued at $1,539,267. This is 24 per cent of the total catch and 23 per cent of the total value. Ohio, with fisheries only on Lake Erie, ranked third with a catch of 15,823,054 pounds, valued at $980,703. This represents 18 per cent of the total catch and 15 per cent of the total value. Minnesota was fourth with a catch of 11,470,267 pounds, valued at $501,747. Minnesota had fisheries on Lake Superior, Lake of the Woods, Rainy Lake, and Namakan Lake, and its catch in these waters amounted to 13 per cent of the total quantity, and 7 per cent of the total value. The catch of fish in New York, which was taken from Lakes Ontario and Erie, amounted to 1,589,898 pounds, valued at $205,478. This is 2 per cent of the total catch and 3 per cent of the total value. The catch in Pennsylvania, taken exclusively in Lake Erie, amounted to 1,342,755 pounds, valued at $163,336. This is 2 per cent of the total catch and 2 per cent of the total value. The catch in Indiana amounted to 1,015,850 pounds, valued at $72,796. This is 1 per cent of the total catch and 1 per cent of the total value The catch in Illinois amounted to 611,287 pounds, valued at $76,335 This is 1 per cent of the total catch and 1 per cent of the total value

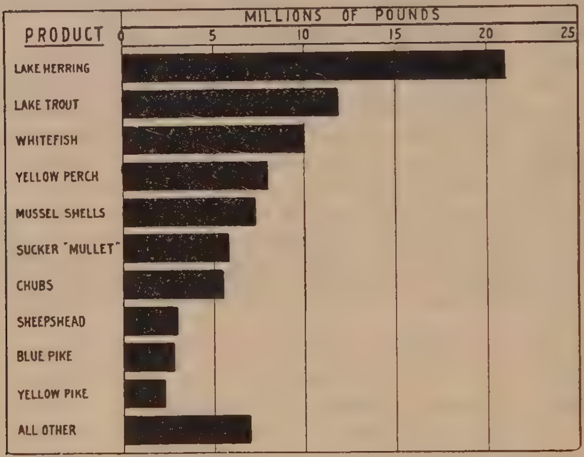

FIGURE 21.—Yield of principal fishery products in the lake fisheries, 1929

Lake fisheries of the United States, 1929

OPERATING UNITS: BY LAKES

Items	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	8	335	225	980	221		1,769
On boats and shore—							
Regular	191	1,062	765	1,539	852	122	4,531
Casual	42	47	37	617	111	5	859
Total	241	1,444	1,027	3,136	1,184	127	7,159
Vessels:							
Steam		32	20	56	14		122
Net tonnage		810	417	1,142	343		2,712
Motor	2	32	40	267	37		378
Net tonnage	24	352	438	2,859	315		3,988
Total vessels	2	64	60	323	51		500
Total net tonnage	24	1,162	855	4,001	658		6,700
Boats:							
Motor	93	307	292	926	404	56	2,078
Other	119	299	126	479	371	7	1,401
Apparatus:							
Haul seines	1	165	68	53	3		290
Length, yards	180	105,960	33,510	19,865	366		159,881
Gill nets	2,310	23,196	9,369	57,574	14,908	1,200	108,557
Square yards	373,735	3,942,049	3,175,756	15,751,061	4,170,634	302,500	27,715,735
Trammel nets		96		4			100
Square yards		3,200		670			3,870
Lines—							
Hand			2				2
Hooks			2				2
Bobbing			4		15		19
Hooks			4		15		19
Set	57	24	100	269	966		1,416
Hooks	17,450	6,600	68,205	318,850	180,920		592,025
Troll				9	25		34
Hooks				9	25		34
Pound nets		56	802	672	87	77	1,694
Trap nets	176	4,490	1,841	313	73		6,893
Fyke nets	78	1,294	299	608	18	114	2,411
Dip nets		24		1			25
Set nets		10					10
Crawfish pots				4,666			4,666
Spears			6				6
Crowfoot bars (pairs)				689			689
Tongs				110			110
Forks			6	416			422
Rakes				10			10
Picks				234			234

OPERATING UNITS: BY STATES AND LAKES

Items	New York			Pennsylvania, Lake Erie	Ohio, Lake Erie
	Lake Ontario	Lake Erie	Total		
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	8	73	81	129	133
On boats and shore—					
Regular	191	66	257	35	797
Casual	42		42		46
Total	241	139	380	164	976
Vessels:					
Steam		4	4	12	16
Net tonnage		84	84	292	434
Motor	2	10	12	12	10
Net tonnage	24	72	96	157	123
Total vessels	2	14	16	24	26
Total net tonnage	24	156	180	449	557

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Items	New York			Pennsylvania, Lake Erie	Ohio, Lake Erie
	Lake Ontario	Lake Erie	Total		
	Number	*Number*	*Number*	*Number*	*Number*
Boats:					
Motor	93	19	112	11	249
Other	119	18	137	15	234
Apparatus:					
Haul seines [1]—					
Fished by boats	1	----------	1	----------	129
Length, yards	180	----------	180	----------	86, 608
"Shoal" gill nets, 3 to 3 1/16 inches [3]—					
Fished by vessels	300	1, 945	2, 245	4, 545	7, 042
Square yards	31, 100	314, 844	345, 944	502, 449	913, 330
Fished by boats	621	513	1, 134	12	367
Square yards	92, 069	74, 042	166, 111	8, 394	65, 805
Total	921	2, 458	3, 379	4, 557	7, 409
Square yards	123, 169	388, 886	512, 055	510, 843	979, 135
"Shoal" gill nets, 4 to 6 inches [4]—					
Fished by vessels	----------	2, 298	2, 298	2, 894	208
Square yards	----------	555, 310	555, 310	506, 908	31, 540
Fished by boats	1, 273	628	1, 901	----------	246
Square yards	211, 115	151, 150	362, 265	----------	34, 996
Total	1, 273	2, 926	4, 199	2, 894	454
Square yards	211, 115	706, 460	917, 575	506, 908	66, 536
"Bull" gill nets, 3 1/16 inches [5]—					
Fished by vessels	----------	572	572	920	----------
Square yards	----------	211, 176	211, 176	298, 788	----------
Fished by boats	----------	262	262	----------	----------
Square yards	----------	80, 120	80, 120	----------	----------
Total	----------	834	834	920	----------
Square yards	----------	291, 296	291, 296	298, 788	----------
"Bull" gill nets, 4¾ inches [6]—					
Fished by vessels	----------	----------	----------	672	----------
Square yards	----------	----------	----------	180, 864	----------
Sturgeon gill nets, 10 to 14 inches [7]—					
Fished by boats	116	66	182	----------	----------
Square yards	39, 451	11, 058	50, 509	----------	----------
Lines [9]—					
Fished by boats	57	13	70	----------	8
Hooks	17, 450	5, 200	22, 650	----------	700
Pound nets [10]—					
Fished by boats	----------	----------	----------	48	8
Trap nets [10]—					
Fished by boats	176	22	198	40	4, 365
Fyke nets [10]—					
Fished by boats	78	----------	78	----------	667
Dip nets, fished by boats [11]	----------	----------	----------	----------	24
Set nets, fished by boats [11]	----------	----------	----------	----------	10

Items	Michigan					Indiana, Lake Michigan
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	----------	225	441	113	779	14
On boats and shore—						
Regular	164	765	945	229	2, 103	95
Casual	1	37	452	56	546	17
Total	165	1, 027	1, 838	398	3, 428	126

See footnotes on p. 497.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: By States and lakes—Continued

Items	Michigan					Indiana, Lake Michigan
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	
Vessels:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Steam	----------	20	29	10	59	1
Net tonnage	----------	417	473	249	1, 139	22
Motor	----------	40	114	24	178	3
Net tonnage	----------	438	1, 033	181	1, 652	49
Total vessels	----------	60	143	34	237	4
Total net tonnage	----------	855	1, 506	430	2, 791	71
Boats:						
Motor	28	292	700	141	1, 161	43
Other	32	126	288	64	510	53
Apparatus:						
Haul seines [1]—						
Fished by vessels	----------	3	----------	----------	3	----------
Length, yards	----------	1, 320	----------	----------	1, 320	----------
Fished by boats	36	65	2	3	106	----------
Length, yards	16, 352	32, 190	65	366	48, 973	----------
Total	36	68	2	3	109	----------
Length, yards	16, 352	33, 510	65	366	50, 293	----------
"Shoal" gill nets, 2¼ to 2¾ inches [2]—						
Fished by vessels	----------	1, 794	4, 665	547	7, 006	222
Square yards	----------	641, 853	1, 028, 195	138, 410	1, 808, 458	90, 420
Fished by boats	----------	534	1, 916	2, 103	4, 553	71
Square yards	----------	136, 870	274, 441	287, 270	698, 581	14, 028
Total	----------	2, 328	6, 581	2, 650	11, 559	293
Square yards	----------	778, 723	1, 302, 636	425, 680	2, 507, 039	104, 448
"Shoal" gill nets, 4 to 6 inches [4]—						
Fished by vessels	----------	4, 985	15, 435	2, 023	22, 443	298
Square yards	----------	1, 811, 061	4, 155, 582	753, 430	6, 720, 073	142, 920
Fished by boats	6	2, 056	6, 626	2, 784	11, 472	32
Square yards	1, 275	585, 972	1, 881, 522	719, 615	3, 188, 384	7, 250
Total	6	7, 041	22, 061	4, 807	33, 915	330
Square yards	1, 275	2, 397, 033	6, 037, 104	1, 473, 045	9, 908, 457	150, 170
Trammel nets [8]—						
Fished by boats	96	----------	----------	----------	96	----------
Square yards	3, 200	----------	----------	----------	3, 200	----------
Lines [9]—						
Fished by vessels	----------	66	54	87	207	----------
Hooks	----------	48, 600	98, 400	83, 250	230, 250	----------
Fished by boats	3	40	14	381	438	----------
Hooks	700	19, 611	12, 209	70, 380	102, 900	----------
Total	3	106	68	468	645	----------
Hooks	700	68, 211	110, 609	153, 630	333, 150	----------
Pound nets [10]—						
Fished by vessels	----------	85	155	27	267	----------
Fished by boats	----------	717	324	10	1, 051	7
Total	----------	802	479	37	1, 318	7
Trap nets [10]—						
Fished by vessels	----------	331	50	12	393	----------
Fished by boats	63	1, 510	115	58	1, 746	----------
Total	63	1, 841	165	70	2, 139	----------
Fyke nets [10]—						
Fished by vessels	----------	----------	10	----------	10	----------
Fished by boats	627	299	18	2	946	----------
Total	627	299	28	2	956	----------
Dip nets, fished by boats [11]	----------	----------	----------	----------	----------	1
Spears, fished by boats	----------	6	----------	----------	6	----------
Crowfoot bars [13]	----------	----------	615	----------	615	49
Tongs [13]	----------	----------	110	----------	110	----------
Forks [13]	----------	6	345	----------	351	49
Rakes [13]	----------	----------	10	----------	10	----------
Picks [13]	----------	----------	185	----------	185	49

See footnotes on p. 497.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Items	Illinois, Lake Michigan	Wisconsin			Minnesota		
		Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	42	483	106	589	2		2
On boats and shore—							
Regular	15	484	158	642	465	122	587
Casual		148	27	175	28	5	33
Total	57	1, 115	291	1, 406	495	127	622
Vessels:							
Steam	2	24	4	28			
Net tonnage	29	618	94	712			
Motor	8	142	12	154	1		1
Net tonnage	114	1, 663	124	1, 787	10		10
Total vessels	10	166	16	182	1		1
Total net tonnage	143	2, 281	218	2, 499	10		10
Boats:							
Motor	7	176	68	244	195	56	251
Other		138	38	176	269	7	276
Apparatus:							
Haul seines [1]—							
Fished by vessels		9		9			
Length, yards		5, 000		5, 000			
Fished by boats		42		42			
Length, yards		14, 800		14, 800			
Total		51		51			
Length, yards		19, 800		19, 800			
"Shoal" gill nets, 2¼ to 2¾ inches [2]—							
Fished by vessels	1, 055	6, 629	374	7, 003	50		50
Square yards	207, 515	1, 986, 346	116, 710	2, 103, 056	10, 000		10, 000
Fished by boats	145	3, 664	496	4, 160	3, 569		3, 569
Square yards	19, 000	515, 035	106, 296	621, 331	1, 097, 263		1, 097, 263
Total	1, 200	10, 293	870	11, 163	3, 619		3, 619
Square yards	226, 515	2, 501, 381	223, 006	2. 724, 387	1, 107. 263		1, 107, 263
'Shoal" gill nets, 4 to 6 inches [4]—							
Fished by vessels	1, 008	8, 230	379	8, 609			
Square yards	264, 475	3, 350. 551	118, 970	3, 469, 521			
Fished by boats	80	7, 498	1, 256	8, 754	1, 327	1, 200	2, 527
Square yards	14, 000	1, 799, 781	377, 595	2, 177, 376	445, 075	302, 500	747, 575
Total	1, 088	15, 728	1, 635	17, 363	1, 327	1, 200	2, 527
Square yards	278, 475	5, 150, 332	496, 565	5, 646, 897	445, 075	302, 500	747, 575
Trammel nets [8]—							
Fished by vessels		1		1			
Square yards		135		135			
Fished by boats		3		3			
Square yards		535		535			
Total		4		4			
Square yards		670		670			
Lines [9]—							
Fished by vessels	1	185	6	191			
Hooks	1, 000	197, 050	2, 000	199, 050			
Fished by boats		24	98	122	434		434
Hooks		10, 200	8, 050	18, 250	17, 280		17, 280
Total	1	209	104	313	434		434
Hooks	1, 000	207, 250	10, 050	217, 300	17, 280		17, 280

See footnotes on p. 497.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Items	Illinois, Lake Michigan	Wisconsin			Minnesota		
		Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Pound nets[10]—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fished by vessels	----------	29	27	56	----------	----------	----------
Fished by boats	1	156	23	179	----------	77	77
Total	1	185	50	235	----------	77	77
Trap nets[10]—							
Fished by vessels	----------	78	----------	78	----------	----------	----------
Fished by boats	----------	70	3	73	----------	----------	----------
Total	----------	148	3	151	----------	----------	----------
Fyke nets[10]—							
Fished by vessels	----------	194	----------	194	----------	----------	----------
Fished by boats	----------	386	16	402	----------	114	114
Total	----------	580	16	596	----------	114	114
Crawfish pots, fished by boats[12]	----------	4,666	----------	4,666	----------	----------	----------
Crowfoot bars[13]	----------	25	----------	25	----------	----------	----------
Forks[13]	----------	22	----------	22	----------	----------	----------

[1] Used principally for taking carp, pike, perch, and suckers.

[2] Used principally for taking chubs, herring, perch, and Menominees. Michigan prescribes 2¾ to 2⅞ inches, and Indiana 2½ to 2⅞ inches for chubs, perch, pilot or Menominees, and other rough fish. Indiana prescribes 2⅜ inches for herring, while Michigan prescribes 2¾ to 2⅞ inches, except that 2½ inches may be used from Nov. 1 to Dec. 15 under certain restrictions as to depth, and 2¼ inches from Jan. 1 to Apr. 1 under the ice when bottom of net is not less than 20 feet from bottom of lake or bay. Illinois prescribes 2⅜-inch mesh for herring and 2½ to 2⅞ inches for chubs. Wisconsin prescribes 2⅝ to 2¾ inches for herring, chubs, perch, and other rough fish in Lake Michigan and 2⅜ inches in Green Bay. In Green Bay 2⅛-inch mesh may be used for herring, chubs, perch, and other rough fish from Dec. 1 until the ice goes out, and is to be fished under and hung to ice. In Lake Superior, Wisconsin prescribes 2⅜ inches for herring during November to December. In Minnesota 2⅜ inches may be used for herring but 2⅝ inches for chubs in not less than 60 fathoms.

[3] 3-inch mesh is permitted by New York only, on both Lake Erie and Lake Ontario for both shoal and bull nets and can take any species except whitefish, lake trout, and sturgeon. Pennsylvania and Ohio prescribe a 3$\frac{1}{16}$-inch mesh for both shoal and bull nets for all species except whitefish in Ohio and lake trout in Pennsylvania.

[4] Used principally for taking whitefish, trout, pike, and suckers. No 4½-inch mesh is permitted on Lakes Ontario and Erie, except in the State of Michigan, where none is used. Michigan, Indiana, Illinois, and Minnesota prescribe 4½-inch mesh for whitefish and trout. Wisconsin is the only State that permits 4-inch mesh for these species.

[5] 3-inch mesh is permitted by New York only, on both Lake Erie and Lake Ontario for both shoal and bull nets and can take any species except whitefish, lake trout, and sturgeon. Pennsylvania and Ohio prescribe a 3$\frac{1}{16}$-inch mesh for both shoal and bull nets for all species except whitefish in Ohio and lake trout in Pennsylvania.

[6] Used principally for taking whitefish, trout, and suckers. No 4½-inch is permitted on Lakes Ontario and Erie, except in the State of Michigan, where none is used.

[7] Used principally for taking sturgeon.

[8] Used principally for taking carp.

[9] Used principally for taking trout.

[10] Used for taking miscellaneous fish.

[11] Used principally for taking minnows.

[12] Used for taking crawfish.

[13] Used for taking mussels.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS OF LAKE ONTARIO:[14] BY GEAR

Items	Haul seines	Gill nets	Lines, sturgeon	Trap nets	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels		8				8
On boats and shore	2	118	44	87	16	233
Total	2	126	44	87	16	241
Vessels: Motor, 11 to 20 tons		2				2
Net tonnage		24				24
Boats:						
Motor		63	9	26	5	93
Other	7	26	32	48	7	119
Apparatus:						
Number	1	2, 310	57	176	78	
Length, yards	180					
Square yards		373, 735				
Hooks			17, 450			

OPERATING UNITS OF LAKE ERIE: BY GEAR

Items	Haul seines	Gill nets	Trammel nets	Lines	Pound nets	Trap nets	Fyke nets	Dip nets	Set nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels		333				2				335
On boats and shore	372	180	8	13	29	406	127	24	10	1, 109
Total	372	513	8	13	29	408	127	24	10	1, 444
Vessels:										
Steam—										
5 to 10 tons		1								1
11 to 20 tons		7								7
21 to 30 tons		16								16
31 to 40 tons		5								5
41 to 50 tons		2								2
61 to 70 tons		1								1
Total		32								32
Net tonnage		810								810
Motor—										
5 to 10 tons		20				2				22
11 to 20 tons		7								7
21 to 30 tons		1								1
31 to 40 tons		2								2
Total		30				2				32
Net tonnage		335				17				352
Total vessels		62				2				64
Total net tonnage		1, 145				17				1, 162
Boats:										
Motor	33	76	8		9	158	45			307
Other	175	27		13	11	48	9	24	8	299
Apparatus:										
Number	165	23, 196	96	24	56	4, 490	1, 294	24	10	
Length, yards	105, 960									
Square yards		3, 942, 049	3, 200							
Hooks				6, 600						

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[14] Includes Niagara River below the Falls and the St. Lawrence River.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS OF LAKE HURON:[15] BY GEAR

Items	Haul seines	Gill nets	Lines	Pound nets	Trap nets	Fyke nets	Spears	Forks	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Op vessels	4	176	36	41	36				225
On boats and shore	135	230	24	281	305	48	6	6	802
Total	139	406	60	322	341	48	6	6	1, 027
Vessels:									
Steam—									
5 to 10 tons		5		2					5
11 to 20 tons		6	1	2					7
21 to 30 tons		2	2						3
31 to 40 tons		3							3
51 to 60 tons		2							2
Total		18	3	4					20
Net tonnage		378	65	33					417
Motor—									
5 to 10 tons	1	14		8	12				25
11 to 20 tons		8	1	1	3				12
21 to 30 tons		2	2						2
31 to 40 tons		1	1						1
Total	1	25	4	9	15				40
Net tonnage	8	287	112	76	128				438
Total vessels	1	43	7	13	15				60
Total net tonnage	8	665	177	109	128				855
Boats:									
Motor	22	101	9	113	123	20		3	292
Other	40	46	10	28	32	10		3	126
Apparatus:									
Number	68	9, 369	106	802	1, 841	299	6	6	
Length, yards	33, 510								
Square yards		3, 175, 756							
Hooks			68, 211						

OPERATING UNITS OF LAKE MICHIGAN:[15] BY GEAR

Items	Haul seines	Gill nets	Trammel nets	Lines	Pound nets	Trap nets	Fyke nets
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11	872	3	180	117	27	46
On boats and shore	84	775	5	21	225	57	63
Total	95	1, 647	8	201	342	84	109
Vessels:							
Steam—							
5 to 10 tons		9					
11 to 20 tons	1	25	1	7	1		
21 to 30 tons		8		5			
31 to 40 tons		7		3			
41 to 50 tons		2			1		
51 to 60 tons		1					
Total	1	52	1	15	2		
Net tonnage	13	1, 029	13	330	58		
Motor—							
5 to 10 tons	6	151		20	39	10	17
11 to 20 tons	2	70		14	5	2	4
21 to 30 tons		16		2			
31 to 40 tons		5		1			
41 to 50 tons		1					
Total	8	243		37	44	12	21
Net tonnage	64	2, 683		422	322	110	170
Total vessels	9	295	1	52	46	12	21
Total net tonnage	77	3, 712	13	752	380	110	170
Boats:							
Motor	15	266	2	14	92	21	27
Other	44	61	1	6	63	25	38
Apparatus:							
Number	53	57, 574	4	278	672	313	608
Length, yards	19, 865						
Square yards		15, 751, 061	670				
Hooks				318, 859			

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[15] Includes mussel fisheries of tributary rivers.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS OF LAKE MICHIGAN:[15] BY GEAR—Continued

Items	Dip nets	Craw-fish pots	Crow foot bars	Tongs	Forks	Rakes	Picks	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels								980
On boats and shore	1	46	689	110	416	10	234	2,156
Total	1	46	689	110	416	10	234	3,136
Vessels:								
Steam—								
5 to 10 tons								9
11 to 20 tons								26
21 to 30 tons								9
31 to 40 tons								9
41 to 50 tons								2
51 to 60 tons								1
Total								56
Net tonnage								1,142
Motor—								
5 to 10 tons								170
11 to 20 tons								75
21 to 30 tons								15
31 to 40 tons								6
41 to 50 tons								1
Total								267
Net tonnage								2,859
Total vessels								323
Total net tonnage								4,001
Boats:								
Motor			489		166		30	
Other	1	41	142	110	250	10	200	926
Apparatus: Number	1	4,666	689	110	416	10	234	479

OPERATING UNITS OF LAKE SUPERIOR: BY GEAR

Items	Haul seines	Gill nets	Lines	Pound nets	Trap nets	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		183	59	36	4		221
On boats and shore	6	901	162	12	10	9	963
Total	6	1,084	221	48	14	9	1,184
Vessels:							
Steam—							
5 to 10 tons		1	1				1
11 to 20 tons		2	3				4
21 to 30 tons		5	1	1			6
31 to 40 tons		1					1
41 to 50 tons		1	2				2
Total		10	7	1			14
Net tonnage		248	157	28			343
Motor—							
5 to 10 tons		24	7	6	1		30
11 to 20 tons		4	3	2	1		6
21 to 30 tons		1		1			1
Total		29	10	9	2		37
Net tonnage		250	85	95	18		315
Total vessels		39	17	10	2		51
Total net tonnage		498	242	123	18		658
Boats:							
Motor	3	344	93	5	5	2	404
Other		335	29	4	6	7	371
Apparatus:							
Number	3	14,908	1,006	87	73	18	
Length, yards	366						
Square yards		4,170,634					
Hooks			180,960				

Includes mussel fisheries of tributary rivers.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS OF LAKE OF THE WOODS, RAINEY LAKE, AND NAMAKAN LAKE: BY GEAR

Items	Gill nets	Pound nets	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*
Fishermen:				
On boats and shore	47	51	30	127
Boats:				
Motor	30	20	14	56
Other	3	5	3	7
Apparatus:				
Number	1, 200	77	114	------
Square yards	302, 500	------	------	------

OPERATING UNITS: BY STATES AND COUNTIES

Items	New York									
	Cayuga	Chautauqua	Erie	Jefferson	Monroe	Niagara	Oswego	St. Lawrence	Wayne	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	------	73	------	4	------	------	4	------	------	81
On boats and shore—										
Regular	12	33	33	90	10	13	22	------	44	257
Casual	------	------	------	6	------	26	------	10	------	42
Total	12	106	33	100	10	39	26	10	44	380
Vessels:										
Steam	------	4	------	------	------	------	------	------	------	4
Net tons	------	84	------	------	------	------	------	------	------	84
Motor	------	10	------	1	------	------	1	------	------	12
Net tons	------	72	------	11	------	------	13	------	------	96
Total vessels	------	14	------	1	------	------	1	------	------	16
Total net tonnage	------	156	------	11	------	------	13	------	------	180
Boats:										
Motor	5	9	10	39	4	15	11	------	19	112
Other	6	5	13	52	3	21	3	10	24	137
Haul seines, fished by boats	------	------	------	1	------	------	------	------	------	1
Length, yards	------	------	------	180	------	------	------	------	------	180
Gill nets:										
Fished by vessels	------	4, 815	------	100	------	------	200	------	------	5, 115
Square yards	------	1, 081, 330	------	11, 100	------	------	20, 000	------	------	1, 112, 430
Fished by boats	15	1, 212	257	1, 065	79	75	600	------	176	3, 479
Square yards	1, 665	272, 244	44, 126	176, 708	9, 709	32, 783	102, 234	------	19, 536	659, 005
Total	15	6, 027	257	1, 165	79	75	800	------	176	8, 594
Square yards	1, 665	1, 353, 574	44, 126	187, 808	9, 709	32, 783	122, 234	------	19, 536	1, 771, 435
Lines, fished by boats	------	------	13	8	------	34	------	15	------	70
Hooks	------	------	5, 200	3, 200	------	8, 250	------	6, 000	------	22, 650
Trap nets, fished by boats	10	10	12	131	2	------	------	------	33	198
Fyke nets, fished by boats	------	------	------	74	2	------	------	------	2	78

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Pennsylvania	Ohio							
	Erie	Ashtabula	Cuyahoga	Erie	Lake	Lorain	Lucas	Ottawa	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	129	18	42	61	--------	12	--------	--------	133
On boats and shore—									
Regular	35	102	20	262	53	23	65	272	797
Casual	--------	5	9	20	--------	--------	12	--------	46
Total	164	125	71	343	53	35	77	272	976
Vessels:									
Steam	12	3	7	4	--------	2	--------	--------	16
Net tons	292	46	244	78	--------	66	--------	--------	434
Motor	12	--------	--------	10	--------	--------	--------	--------	10
Net tons	157	--------	--------	123	--------	--------	--------	--------	123
Total vessels	24	3	7	14	--------	2	--------	--------	26
Total net tonnage	449	46	244	201	--------	66	--------	--------	557
Boats:									
Motor	11	36	7	108	18	15	20	45	249
Other	15	9	7	60	6	2	25	125	234
Haul seines, fished by boats	--------	2	2	16	--------	--------	9	100	129
Length, yards	--------	180	163	12, 988	--------	--------	2, 870	73, 407	89, 608
Gill nets:									
Fished by vessels	9, 031	1, 080	1, 936	3, 586	--------	648	--------	--------	7, 250
Square yards	1, 489, 009	120, 000	277, 332	471, 722	--------	75, 816	--------	--------	944, 870
Fished by boats	12	--------	2	473	--------	100	--------	38	613
Square yards	8, 394	--------	335	75, 780	--------	17, 770	--------	6, 916	100, 801
Total	9, 043	1, 080	1, 938	4, 059	--------	748	--------	38	7, 863
Square yards	1, 497, 403	120, 000	277, 667	547, 502	--------	93, 586	--------	6, 916	1, 045, 671
Trammel nets, fished by boats	--------	--------	--------	96	--------	--------	--------	--------	96
Square yards	--------	--------	--------	3, 200	--------	--------	--------	--------	3, 200
Lines, fished by boats	--------	--------	--------	3	--------	--------	5	--------	8
Hooks	--------	--------	--------	450	--------	--------	250	--------	700
Pound nets, fished by boats	48	--------	--------	--------	--------	--------	8	--------	8
Trap nets, fished by boats	40	897	167	1, 943	410	143	313	492	4, 365
Fyke nets, fished by boats	--------	--------	2	3	--------	--------	328	334	667
Dip nets, fished by boats	--------	--------	--------	2	2	2	12	6	24
Set nets, fished by boats	--------	--------	4	6	--------	--------	--------	--------	10

Items	Michigan[16]							
	Alcona	Alger	Allegan	Alpena	Antrim	Arenac	Baraga	Bay
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	32	6	52	--------	--------	4	--------
On boats and shore—								
Regular	14	26	10	79	6	62	8	197
Casual	--------	6	--------	--------	--------	--------	21	8
Total	14	64	16	131	6	62	33	205
Vessels:								
Steam	--------	3	--------	8	--------	--------	--------	--------
Net tonnage	--------	57	--------	245	--------	--------	--------	--------
Motor	--------	7	3	1	--------	--------	2	--------
Net tonnage	--------	55	19	8	--------	--------	16	--------
Total vessels	--------	10	3	9	--------	--------	2	--------
Total net tonnage	--------	112	19	253	--------	--------	16	--------
Boats:								
Motor	5	17	5	29	1	23	9	61
Other	2	2	--------	13	2	8	19	51
Haul seines:								
Fished by boats	--------	--------	--------	--------	--------	15	--------	41
Length, yards	--------	--------	--------	--------	--------	6, 600	--------	22, 390

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[16] Exclusive of the mussel fisheries of streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Michigan[16]							
	Alcona	Alger	Allegan	Alpena	Antrim	Arenac	Baraga	Bay
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Gill nets:								
Fished by vessels	--------	616	152	2, 152	--------	--------	80	--------
Square yards	--------	214, 680	25, 232	682, 000	--------	--------	24, 775	--------
Fished by boats	--------	94	295	139	30	--------	157	274
Square yards	--------	23, 005	48, 970	40, 855	4, 440	--------	26, 580	49, 160
Total	--------	710	447	2, 291	30	--------	237	274
Square yards	--------	237, 685	74, 202	722, 855	4, 440	--------	51, 355	49, 160
Lines:								
Fished by vessels	--------	44	--------	6	--------	--------	--------	--------
Hooks	--------	39, 000	--------	14, 000	--------	--------	--------	--------
Fished by boats	--------	80	--------	--------	--------	--------	--------	6
Hooks	--------	17, 240	--------	--------	--------	--------	--------	1, 000
Total	--------	124	--------	6	--------	--------	--------	6
Hooks	--------	56, 240	--------	14, 000	--------	--------	--------	1, 000
Pound nets:								
Fished by vessels	--------	4	--------	11	--------	--------	4	--------
Fished by boats	19	7	1	83	4	52	3	85
Total	19	11	1	94	4	52	7	85
Trap nets:								
Fished by vessels	--------	6	--------	--------	--------	--------	6	--------
Fished by boats	18	--------	--------	61	4	42	4	648
Total	18	6	--------	61	4	42	10	648
Fyke nets:								
Fished by boats	--------	--------	--------	--------	--------	27	2	34

Items	Michigan[16]							
	Benzie	Berrien	Charlevoix	Cheboygan	Chippewa	Delta	Emmet	Grand Travers
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	25	26	80	43	17	59	7	6
On boats and shore—								
Regular	4	6	29	53	46	186	22	24
Casual	--------	17	1	--------	19	9	1	--------
Total	29	49	110	96	82	254	30	30
Vessels:								
Steam	3	1	4	1	3	--------	--------	1
Net tonnage	31	39	59	11	22	--------	--------	9
Motor	4	4	21	16	3	23	2	1
Net tonnage	65	46	186	139	24	213	12	6
Total vessels	7	5	25	17	6	23	2	2
Total net tonnage	96	85	245	150	46	213	12	15
Boats:								
Motor	1	8	22	21	17	70	13	11
Other	--------	7	5	12	21	37	3	3
Haul seines:								
Fished by boats	--------	1	--------	--------	--------	--------	--------	--------
Length, yards	--------	15	--------	--------	--------	--------	--------	--------
Gill nets:								
Fished by vessels	1, 494	1, 056	3, 322	498	164	2, 045	--------	110
Square yards	527, 592	218, 400	927, 549	154, 635	42, 950	685, 290	--------	11, 190
Fished by boats	72	231	230	602	1, 186	2, 978	298	277
Square yards	26, 280	52, 360	53, 330	136, 055	148, 507	1, 121, 712	72, 797	31, 300
Total	1, 566	1, 287	3, 552	1, 100	1, 350	5, 023	298	387
Square yards	553, 872	270, 760	980, 879	290, 690	191, 457	1, 807, 002	72, 797	42, 490

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[16] Exclusive of the mussel fisheries of streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Michigan [16]							
	Benzie	Berrien	Charlevoix	Cheboygan	Chippewa	Delta	Emmet	Grand Travers
Lines:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fished by vessels		3	6		8			
Hooks		8, 400	10, 000		14, 000			
Fished by boats		2			18	5		2
Hooks		200			35, 000	5		2
Total		5	6		26	5		2
Hooks		8, 600	10, 000		49, 000	5		2
Pound nets:								
Fished by vessels		2		40	19	76	24	2
Fished by boats			20	15	14	126		15
Total		2	20	55	33	202	24	17
Trap nets:								
Fished by vessels				277		34		3
Fished by boats				148	64	56		12
Total				425	64	90		15
Fyke nets:								
Fished by vessels						10		
Fished by boats						18		
Total						28		

Items	Michigan [16]							
	Gogebic	Houghton	Huron	Iosco	Keweenaw	Leelanaw	Mackinac	Manistee
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		20	15	22	4	44	85	22
On boats and shore—								
Regular	15	138	202	50	5	40	100	
Casual		4					29	2
Total	15	162	217	72	9	84	214	24
Vessels:								
Steam			2	1		4	2	
Net tonnage			57	15		57	18	
Motor		8	1	5	1	12	27	6
Net tonnage		51	14	68	10	85	223	46
Total vessels		8	3	6	1	16	29	6
Total net tonnage		51	71	83	10	142	241	46
Boats:								
Motor	9	90	78	21	4	13	48	1
Other	4	13	10	1	1	10	19	1
Haul seines:								
Fished by boats		2	6					
Length, yards		266	1, 720					
Gill nets:								
Fished by vessels		798	300	906		2, 466	2, 220	1, 047
Square yards		251, 380	124, 680	403, 564		512, 936	733, 657	266, 170
Fished by boats	100	3, 395	219	261	70	802	1, 418	6
Square yards	21, 725	802, 338	71, 772	105, 884	12, 590	140, 164	392, 421	1, 100
Total	100	4, 193	519	1, 167	70	3, 268	3, 638	1, 053
Square yards	21, 725	1, 053, 718	196, 452	509, 448	12, 590	653, 100	1, 126, 078	267, 270
Lines:								
Fished by vessels			3	3		12		8
Hooks			7, 000	6, 000		12, 600		9, 500
Fished by boats		255	23			5	2	
Hooks		12, 750	18, 402			12, 002	2	
Total		255	26	3		17	2	8
Hooks		12, 750	25, 402	6, 000		24, 602	2	9, 500

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[16] Exclusive of the mussel fisheries of streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Michigan [16]							
	Gogebic	Houghton	Huron	Iosco	Keweenaw	Leelanaw	Mackinac	Manistee
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets:								
Fished by vessels	-----	1	-----	-----	10	17	45	-----
Fished by boats	-----	-----	321	88	-----	13	97	-----
Total	-----	1	321	88	10	30	142	-----
Trap nets:								
Fished by vessels	-----	-----	-----	-----	-----	13	15	-----
Fished by boats	-----	-----	518	33	-----	6	11	-----
Total	-----	-----	518	33	-----	19	26	-----
Fyke nets:								
Fished by boats	-----	-----	133	-----	-----	-----	-----	-----
Spears, fished by boats	-----	-----	6	-----	-----	-----	-----	-----

Items	Michigan [16]								
	Marquette	Mason	Menominee	Monroe	Muskegon	Oceana	Ontonagon	Ottawa	Presque Isle
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	22	17	11	-----	13	2	25	35	25
On boats and shore—Regular	7	8	66	117	20	-----	5	13	5
Casual	4	-----	-----	-----	4	-----	2	-----	-----
Total	33	25	77	117	37	2	32	48	30
Vessels:									
Steam	3	1	-----	-----	1	-----	4	8	1
Net tonnage	98	15	-----	-----	12	-----	94	114	8
Motor	2	7	4	-----	4	1	2	-----	4
Net tonnage	17	70	42	-----	26	12	13	-----	98
Total vessels	5	8	4	-----	5	1	6	8	5
Total net tonnage	115	85	42	-----	38	12	107	114	106
Boats:									
Motor	6	3	24	21	8	-----	2	7	1
Other	-----	2	2	20	9	-----	5	3	3
Haul seines:									
Fished by boats	1	-----	-----	25	-----	-----	-----	-----	-----
Length, yards	100	-----	-----	12, 622	-----	-----	-----	-----	-----
ill nets:									
Fished by vessels	614	702	606	-----	384	120	432	3, 072	1, 134
Square yards	272, 440	163, 900	235, 240	-----	79, 288	24, 000	119, 115	493, 905	484, 118
Fished by boats	87	96	1, 509	-----	488	-----	61	117	20
Square yards	24, 190	24, 000	221, 367	-----	89, 028	-----	15, 450	19, 500	8, 540
Total	701	798	2, 115	-----	872	120	493	3, 189	1, 154
Square yards	296, 630	187, 900	456, 607	-----	168, 316	24, 000	134, 565	513, 405	492, 658
Lines:									
Fished by vessels	22	-----	-----	-----	6	-----	13	16	54
Hooks	3, 500	-----	-----	-----	10, 500	-----	16, 750	38, 400	21, 600
Fished by boats	26	-----	-----	3	-----	-----	2	-----	-----
Hooks	3, 640	-----	-----	700	-----	-----	1, 750	-----	-----
Total	48	-----	-----	3	6	-----	15	16	54
Hooks	17, 140	-----	-----	700	10, 500	-----	18, 500	38, 400	21, 600
Pound nets:									
Fished by vessels	-----	2	-----	-----	4	-----	3	-----	-----
Fished by boats	-----	4	32	-----	4	-----	-----	7	9
Total	-----	6	32	-----	8	-----	3	7	9
Trap nets:									
Fished by boats	2	8	-----	31	-----	-----	-----	-----	-----
Fyke nets:									
Fished by boats	-----	-----	-----	213	-----	-----	-----	-----	-----

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[16] Exclusive of the mussel fisheries of streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Michigan[16]							
	Saginaw	Sanilac	Schoolcraft	St. Clair	Tuscola	Van Buren	Wayne	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	19	11	4	26	--------	779
On boats and shore—								
Regular	3	12	2	21	8	6	47	1,662
Casual	--------	--------	--------	--------	--------	3	1	131
Total	3	12	21	32	12	35	48	2,572
Vessels:								
Steam	--------	--------	2	2	--------	4	--------	59
Net tonnage	--------	--------	57	41	--------	80	--------	1,139
Motor	--------	--------	3	--------	1	3	--------	178
Net tonnage	--------	--------	56	--------	8	24	--------	1,652
Total vessels	--------	--------	5	2	1	7	--------	237
Total net tonnage	--------	--------	113	41	8	104	--------	2,791
Boats:								
Motor	1	6	1	8	3	2	7	677
Other	1	2	1	2	2	2	12	310
Haul seines:								
Fished by vessels	--------	--------	--------	--------	3	--------	--------	3
Length, yards	--------	--------	--------	--------	1,320	--------	--------	1,320
Fished by boats	1	--------	--------	--------	2	1	11	106
Length, yards	600	--------	--------	--------	880	50	3,730	48,973
Total	1	--------	--------	--------	5	1	11	109
Length, yards	600	--------	--------	--------	2,200	50	3,730	50,293
Gill nets:								
Fished by vessels	--------	--------	970	526	300	1,163	--------	23,364
Square yards	--------	--------	348,600	158,325	99,800	243,120	--------	8,528,531
Fished by boats	--------	--------	--------	172	--------	335	6	22,110
Square yards	--------	--------	--------	44,860	--------	55,410	1,275	3,886,965
Total	--------	--------	970	698	300	1,498	6	45,474
Square yards	--------	--------	348,600	203,185	99,800	298,530	1,275	12,415,496
Lines:								
Fished by vessels	--------	--------	--------	--------	--------	3	--------	207
Hooks	--------	--------	--------	--------	--------	9,000	--------	230,250
Fished by boats	5	--------	--------	4	--------	--------	--------	438
Hooks	5	--------	--------	202	--------	--------	--------	102,900
Total	5	--------	--------	4	--------	3	--------	645
Hooks	5	--------	--------	202	--------	9,000	--------	333,150
Pound nets:								
Fished by vessels	--------	--------	--------	--------	--------	3	--------	267
Fished by boats	--------	20	--------	1	9	2	--------	1,051
Total	--------	20	--------	1	9	5	--------	1,318
Trap nets:								
Fished by vessels	--------	--------	--------	--------	39	--------	--------	393
Fished by boats	11	15	20	2	--------	--------	32	1,746
Total	11	15	20	2	39	--------	32	2,139
Fyke nets:								
Fished by vessels	--------	--------	--------	--------	--------	--------	--------	10
Fished by boats	--------	15	--------	70	20	--------	414	946
Total	--------	15	--------	70	20	--------	414	956
Spears, fished by boats	--------	--------	--------	--------	--------	--------	--------	6

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[16] Exclusive of the mussel fisheries of streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Indiana [17]			Illinois			Wisconsin [17]		
	La Porte	Porter	Total	Cook	Lake	Total	Ashland	Bayfield	Brown
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	14	--------	14	19	23	42	--------	104	54
On boats and shore—									
Regular	5	5	10	13	2	15	12	136	68
Casual	--------	4	4	--------	--------	--------	2	22	102
Total	19	9	28	32	25	57	14	262	224
Vessels:									
Steam	1	--------	1	1	1	2	--------	4	2
Net tonnage	22	--------	22	16	13	29	--------	94	43
Motor	3	--------	3	4	4	8	--------	11	21
Net tonnage	49	--------	49	57	57	114	--------	118	163
Total vessels	4	--------	4	5	5	10	--------	15	23
Total net tonnage	71	--------	71	73	70	143	--------	212	206
Boats:									
Motor	3	4	7	6	1	7	6	56	41
Other	--------	1	1	--------	--------	--------	3	31	63
Haul seines:									
Fished by vessels	--------	--------	--------	--------	--------	--------	--------	--------	4
Length, yards	--------	--------	--------	--------	--------	--------	--------	--------	2, 535
Fished by boats	--------	--------	--------	--------	--------	--------	--------	--------	30
Length, yards	--------	--------	--------	--------	--------	--------	--------	--------	10, 270
Total	--------	--------	--------	--------	--------	--------	--------	--------	34
Length yards	--------	--------	--------	--------	--------	--------	--------	--------	12, 805
Gill nets:									
Fished by vessels	520	--------	520	865	1, 198	2, 063	--------	718	893
Square yards	233, 340	--------	233, 340	127, 910	344, 080	471, 990	--------	229, 455	110, 250
Fished by boats	60	43	103	225	--------	225	163	1, 534	852
Square yards	12, 233	9, 045	21, 278	33, 000	--------	33, 000	9, 955	463, 189	104, 136
Total	580	43	623	1, 090	1, 198	2, 288	163	2, 252	1, 745
Square yards	245, 573	9, 045	254, 618	160, 910	344, 080	504, 990	9, 955	692, 644	214, 386
Trammel nets:									
Fished by vessels	--------	--------	--------	--------	--------	--------	--------	--------	1
Square yards	--------	--------	--------	--------	--------	--------	--------	--------	135
Fished by boats	--------	--------	--------	--------	--------	--------	--------	--------	2
Square yards	--------	--------	--------	--------	--------	--------	--------	--------	335
Total	--------	--------	--------	--------	--------	--------	--------	--------	3
Square yards	--------	--------	--------	--------	--------	--------	--------	--------	470
Lines:									
Fished by vessels	--------	--------	--------	1	--------	1	--------	6	30
Hooks	--------	--------	--------	1, 000	--------	1, 000	--------	2, 000	60, 000
Fished by boats	--------	--------	--------	--------	--------	--------	--------	98	--------
Hooks	--------	--------	--------	--------	--------	--------	--------	8, 050	--------
Total	--------	--------	--------	1	--------	1	--------	104	30
Hooks	--------	--------	--------	1, 000	--------	1, 000	--------	10, 050	60, 000
Pound nets:									
Fished by vessels	--------	--------	--------	--------	--------	--------	--------	27	12
Fished by boats	2	5	7	--------	1	1	--------	23	--------
Total	2	5	7	--------	1	1	--------	50	12
Trap nets:									
Fished by vessels	--------	--------	--------	--------	--------	--------	2	--------	47
Fished by boats	--------	--------	--------	--------	--------	--------	--------	--------	11
Total	--------	--------	--------	--------	--------	--------	2	--------	58
Fyke nets:									
Fished by vessels	--------	--------	--------	--------	--------	--------	3	--------	127
Fished by boats	--------	--------	--------	--------	--------	--------	--------	11	305
Total	--------	--------	--------	--------	--------	--------	3	11	432
Dip nets, fished by boats	--------	1	1	--------	--------	--------	--------	--------	--------
Crawfish pots, fished by boats	--------	--------	--------	--------	--------	--------	--------	--------	3, 166

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[17] Exclusive of the mussel fisheries of streams tributary to Lake Michigan.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Wisconsin[17]							
	Door	Douglas	Kenosha	Kewaunee	Manitowoc	Marinette	Milwaukee	Oconto
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	143	2	29	28	41	9	49	57
On boats and shore—								
Regular	153	10		34	16	84	3	96
Casual		3	3		12			
Total	296	15	32	62	69	93	52	153
Vessels:								
Steam				1	1		8	
Net tonnage				19	18		170	
Motor	60	1	8	9	11	3	3	24
Net tonnage	584	6	158	94	235	49	74	198
Total vessels	60	1	8	10	12	3	11	24
Total net tonnage	584	6	158	113	253	49	244	198
Boats:								
Motor	43	6	1	4	4	17	1	29
Other	11	4	1	9	12	8	1	15
Haul seines:								
Fished by vessels								5
Length, yards								2, 465
Fished by boats	2				1			9
Length, yards	800				65			3, 665
Total	2				1			14
Length, yards	800				65			6, 130
Gill nets:								
Fished by vessels	4, 633	35	592	556	1, 069	512	2, 574	2, 459
Square yards	2, 298, 180	6, 225	214, 195	232, 975	335, 725	114, 775	713, 102	304, 540
Fished by boats	4, 448	55	3	1, 085	35	2, 410	6	2, 224
Square yards	1, 332, 875	10, 747	620	253, 081	3, 335	305, 160	804	267, 150
Total	9, 081	90	595	1, 641	1, 104	2, 922	2, 580	4, 683
Square yards	3, 631, 055	16, 972	214, 815	486, 056	339, 060	419, 935	713, 906	571, 690
Lines:								
Fished by vessels	106		14	18	2			
Hooks	43, 900		25, 550	25, 400	2, 000			
Fished by boats	22			1				
Hooks	8, 000			2, 000				
Total	128		14	19	2			
Hooks	51, 900		25, 550	27, 400	2, 000			
Pound nets:								
Fished by vessels	9					2		3
Fished by boats	46				40	11		14
Total	55				40	13		17
Trap nets:								
Fished by vessels	10							21
Fished by boats	22	1		2				35
Total	32	1		2				56
Fyke nets:								
Fished by vessels								67
Fished by boats	7	2			3	6		65
Total	7	2			3	6		132
Crawfish pots, fished by boats					1, 500			

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[17] Exclusive of the mussel fisheries of streams tributary to Lake Michigan.

Lake fisheries of the United States, 1929—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Items	Wisconsin[17]				Minnesota			
	Ozaukee	Racine	Sheboygan	Total	Cook	Koochiching and Roseau	St. Louis	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	23	25	25	589			2	2
On boats and shore—								
Regular	2		23	637	398	122	67	587
Casual			2	146		5	28	33
Total	25	25	50	1,372	398	127	97	622
Vessels:								
Steam	4	5	3	28				
Net tonnage	109	126	133	712				
Motor	1		2	154			1	1
Net tonnage	40		68	1,787			10	10
Total vessels	5	5	5	182			1	1
Total net tonnage	149	126	201	2,499			10	10
Boats:								
Motor	2		9	219	167	56	28	251
Other	2		7	167	214	7	55	276
Haul seines:								
Fished by vessels				9				
Length, yards				5,000				
Fished by boats				42				
Length, yards				14,800				
Total				51				
Length, yards				19,800				
Gill nets:								
Fished by vessels	515	444	612	15,612		1,200	50	1,250
Square yards	510,650	186,625	315,880	5,572,577		302,500	10,000	312,500
Fished by boats			99	12,914	3,356		1,540	4,896
Square yards			47,655	2,798,707	1,061,403		480,935	1,542,338
Total	515	444	711	28,526	3,356	1,200	1,590	6,146
Square yards	510,650	186,625	363,535	8,371,284	1,061,403	302,500	490,935	1,854,838
Trammel nets:								
Fished by vessels				1				
Square yards				135				
Fished by boats			1	3				
Square yards			200	535				
Total			1	4				
Square yards			200	670				
Lines:								
Fished by vessels		12	3	191				
Hooks		34,200	6,000	199,050				
Fished by boats			1	122	434			434
Hooks			200	18,250	17,280			17,280
Total		12	4	313	434			434
Hooks		34,200	6,200	217,300	17,280			17,280
Pound nets:								
Fished by vessels			3	56		77		77
Fished by boats	11		34	179				
Total	11		37	235		77		77
Trap nets:								
Fished by vessels				71				
Fished by boats				80				
Total				151				
Fyke nets:								
Fished by vessels				197		114		114
Fished by boats				399				
Total				596		114		114
Crawfish pots, fished by boats				4,666				

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[17] Exclusive of the mussel fisheries of streams tributary to Lake Michigan.

Lake fisheries of the United States, 1929—Continued

CATCH: BY STATES

Species	New York		Pennsylvania		Ohio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	318, 735	$26, 428	713, 162	$58, 800	1, 802, 710	$103, 656
Bowfin	4, 611	258				
Burbot	105, 877	5, 882	16, 045	274	334, 500	4, 181
Carp	24, 226	1, 910	3, 625	210	467, 170	20, 000
Catfish and bullheads	49, 434	9, 527	1, 000	120	213, 167	31, 976
Cisco	13, 666	2, 060	87, 870	13, 109	26, 338	3, 687
Eels	63, 111	5, 993				
Goldfish					10, 380	415
Lake herring	415, 590	45, 395				
Lake trout	62, 788	9, 050	500	85		
Mooneye					12, 155	364
Pike (jacks)	9, 022	1, 395				
Rock bass	489	49				
Saugers			1, 000	84	1, 528, 887	120, 000
Sheepshead	688	28	4, 890	260	2, 860, 161	71, 504
Smelt	221	47				
Sturgeon	3, 942	1, 925	205	62	219	60
Sucker "mullet"	73, 047	8, 753	14, 098	349	1, 211, 208	36, 336
Sunfish	9, 011	543				
White bass	60	6	4, 000	230	151, 267	9, 076
Whitefish: Common	324, 780	76, 464	316, 939	80, 703	534, 748	101, 602
Yellow perch	88, 301	4, 238	177, 271	8, 560	5, 779, 018	317, 846
Yellow pike	22, 299	5, 527	2, 150	490	891, 126	160, 000
Total	1, 589, 898	205, 478	1, 342, 755	163, 336	15, 823, 054	980, 703

Species	Michigan		Indiana		Illinois	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	27, 169	$742				
Buffalofish	1, 651	165				
Burbot	10, 138	243	6, 597	$292		
Carp	902, 491	28, 441	200	12		
Catfish and bullheads	304, 707	24, 397				
Chubs	1, 425, 385	168, 175	158, 311	13, 635	302, 745	$25, 556
Lake herring	4, 814, 452	119, 006	158, 185	12, 435	51, 000	1, 710
Lake trout	6, 809, 483	977, 069	131, 957	19, 035	247, 442	46, 699
Mooneye	3, 596	311				
Pike (jacks)	68, 408	6, 568				
Rock bass	10, 026	957				
Saugers	64, 014	5, 838				
Sheepshead	110, 660	2, 382				
Sturgeon	1, 296	311				
Sucker "mullet"	2, 409, 571	96, 384	250	6		
Whitefish:						
Common	8, 130, 055	1, 298, 689	33, 275	4, 789	3, 100	750
Menominee	400, 140	25, 874				
Yellow perch	669, 701	57, 210	10, 975	925	7, 000	1, 620
Yellow pike	660, 192	117, 301				
Mussel shells [18]	6, 550, 000	301, 650	516, 100	18, 062		
Pearls and slugs [18]		16, 375		3, 605		
Total	33, 373, 135	3, 248, 088	1, 015, 850	72, 796	611, 287	76, 335

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[18] From streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

CATCH: By States—Continued

Species	Wisconsin		Minnesota		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					2, 834, 607	$188, 884
Bowfin					31, 780	1, 000
Buffalofish	11	$1			1, 662	166
Burbot	18, 707	498	119, 919	$1, 045	611, 783	12, 415
Carp	602, 883	17, 952	16, 925	677	2, 017, 520	69, 202
Catfish and bullheads	64, 893	3, 362	48, 595	3, 000	681, 796	72, 382
Chubs	3, 448, 569	372, 448	266, 429	9, 500	5, 601, 439	589, 314
Cisco					127, 874	18, 856
Crappie			2, 540	500	2, 540	500
Eels					63, 111	5, 993
Goldeye			220	7	220	7
Goldfish					10, 380	415
Lake herring	7, 088, 553	178, 856	8, 570, 942	263, 512	21, 098, 722	620, 914
Lake trout	4, 375, 031	638, 637	322, 359	54, 030	11, 949, 560	1, 744, 605
Mooneye					15, 751	675
Pike (jacks)	61, 169	6, 551	361, 742	18, 305	500, 341	32, 819
Rock bass	28, 165	1, 329			38, 680	2, 335
Saugers			41, 795	3, 315	1, 635, 696	129, 237
Sheepshead					2, 976, 399	74, 174
Smelt					221	47
Sturgeon			1, 428	500	7, 090	2, 858
Sucker "mullet"	1, 963, 548	102, 630	243, 180	6, 034	5, 914, 902	250, 492
Sunfish	50	4			9, 061	547
Tullibee			573, 679	23, 200	573, 679	23, 200
White bass	339	18			155, 666	9, 330
Whitefish						
Common	706, 369	114, 635	82, 578	10, 721	10, 131, 844	1, 688, 353
Menominee	116, 366	8, 234	16, 452	1, 325	532, 958	35, 433
Yellow perch	1, 250, 164	72, 473	30, 766	3, 076	8, 013, 196	465, 948
Yellow pike	37, 783	7, 284	770, 718	103, 000	2, 384, 268	393, 602
Crawfish	52, 200	4, 400			52, 200	4, 400
Mussel shells [18]	348, 421	9, 070			7, 414, 521	328, 782
Pearls and slugs [18]		885				20, 865
Total	20, 163, 221	1, 539, 267	11, 470, 267	501, 747	85, 389, 467	6, 787, 750

CATCH: By lakes

Species	Lake Ontario		Lake Erie			
	New York		New York		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	14, 181	$2, 064	304, 554	$24, 364	713, 162	$58, 800
Bowfin	4, 611	258				
Burbot	92, 295	5, 203	13, 582	679	16, 045	274
Carp	23, 905	1, 884	321	26	3, 625	210
Catfish and bullheads	48, 054	9, 389	1, 380	138	1, 000	120
Cisco			13, 666	2, 060	87, 870	13, 109
Eels	59, 604	5, 737	3, 507	256		
Lake herring	415, 590	45, 395				
Lake trout	62, 247	8, 953	541	97	500	85
Pike (jacks)	9, 022	1, 395				
Rock bass			489	49		
Sauger					1, 000	84
Sheepshead			688	28	4, 890	260
Smelt	221	47				
Sturgeon	2, 038	973	1, 904	952	205	62
Sucker "mullet"	62, 368	5, 691	10, 679	3, 062	14, 098	349
Sunfish	8, 762	518	249	25		
White bass			60	6	4, 000	230
Whitefish: Common	97, 489	19, 641	227, 291	56, 823	316, 939	80, 703
Yellow perch	36, 387	2, 681	51, 914	1, 557	177, 271	8, 560
Yellow pike	11, 022	3, 808	11, 277	1, 719	2, 150	490
Total	947, 796	113, 637	642, 102	91, 841	1, 342, 755	163, 336

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[18] From streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

CATCH: BY LAKES—Continued

Species	Lake Erie					
	Ohio		Michigan		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	1,802,710	$103,656			2,820,426	$186,820
Bowfin			4,114	$165	4,114	165
Buffalofish			1,380	138	1,380	138
Burbot	334,500	4,181			364,127	5,134
Carp	467,170	20,000	508,574	12,714	979,690	32,950
Catfish and bullheads	213,167	31,976	89,487	7,094	305,034	39,328
Cisco	26,338	3,687			127,874	18,856
Eels					3,507	256
Goldfish	10,380	415			10,380	415
Lake trout					1,041	182
Mooneye	12,155	364	701	21	12,856	385
Pike (jacks)			6,465	646	6,465	646
Rock bass			328	16	817	65
Sauger	1,528,887	120,000	13,542	1,016	1,543,429	121,100
Sheepshead	2,860,161	71,504	93,729	1,875	2,959,468	73,667
Sturgeon	219	60			2,328	1,074
Sucker "mullet"	1,211,208	36,336	60,126	1,503	1,296,111	41,250
Sunfish					249	25
White bass	151,267	9,076			155,327	9,312
Whitefish: Common	534,748	101,602			1,078,978	239,128
Yellow perch	5,779,018	317,846	35,509	2,131	6,043,712	330,094
Yellow pike	891,126	160,000	24,833	4,967	929,386	167,176
Total	15,823,054	980,703	838,788	32,286	18,646,699	1,268,166

Species	Lake Huron		Lake Michigan			
	Michigan		Michigan		Indiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	23,001	$575	54	$2		
Buffalofish			271	27		
Burbot	1,821	73	8,264	168	6,597	$292
Carp	388,143	15,526	5,257	185	200	12
Catfish and bullheads	214,460	17,262	751	38		
Chubs	316,132	31,613	963,716	125,283	158,311	13,635
Lake herring	2,657,707	71,547	576,509	15,854	158,185	12,435
Lake trout	1,699,057	250,453	2,741,161	465,997	131,957	19,035
Mooneye	2,895	290				
Pike (jacks)	43,739	4,374	14,401	1,500		
Rock bass	9,161	916	537	25		
Sauger	29,574	2,662	11,565	1,040		
Sheepshead	15,571	467	1,360	40		
Sturgeon			1,296	311		
Sucker "mullet"	1,584,770	55,467	658,438	36,214	250	6
Whitefish:						
Common	2,178,534	313,661	5,808,167	968,028	33,275	4,789
Menominee	109,251	9,729	281,121	15,461		
Yellow perch	525,097	47,258	106,021	7,421	10,975	925
Yellow pike	578,187	101,183	33,239	5,651		
Mussels [18]	100,000	4,250	6,450,000	297,400	516,100	18,062
Pearls and slugs [18]		250		16,125		3,605
Total	10,477,100	927,556	17,662,128	1,956,770	1,015,850	72,796

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[18] From streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

CATCH: BY LAKES—Continued

Species	Lake Michigan					
	Illinois		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					54	$2
Buffalofish			11	$1	282	28
Burbot			18, 707	498	33, 568	958
Carp			602, 383	17, 937	607, 840	18, 134
Catfish and bullheads			64, 797	3, 359	65, 548	3, 397
Chubs	302, 745	$25, 556	3, 024, 043	336, 099	4, 448, 815	500, 573
Lake herring	51, 000	1, 710	4, 463, 446	117, 162	5, 249, 140	147, 161
Lake trout	247, 442	46, 699	3, 817, 263	570, 861	6, 937, 823	1, 102, 592
Pike (jacks)			48, 394	4, 942	62, 795	6, 442
Rock bass			28, 165	1, 329	28, 702	1, 354
Sauger					11, 565	1, 040
Sheepshead					1, 360	40
Sturgeon					1, 296	311
Sucker "mullet"			1, 834, 974	98, 412	2, 493, 662	134, 632
White bass			339	18	339	18
Whitefish:						
Common	3, 100	750	644, 489	106, 552	6, 489, 031	1, 080, 119
Menominee			107, 056	7, 584	388, 177	23, 045
Yellow perch	7, 000	1, 620	1, 248, 682	72, 293	1, 372, 678	82, 259
Yellow pike			21, 936	3, 691	55, 175	9, 342
Crawfish			52, 200	4, 400	52, 200	4, 400
Mussels [18]			348, 421	9, 070	7, 314, 521	324, 532
Pearls and slugs [18]				885		20, 615
Total	611, 287	76, 335	16, 325, 306	1, 355, 093	35, 614, 571	3, 460, 994

Species	Lake Superior					
	Michigan		Wisconsin		Minnesota	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	53	$2				
Carp	517	16	500	$15		
Catfish and bullheads	9	3	96	3		
Chubs	145, 537	11, 279	424, 526	36, 349		
Lake herring	1, 580, 236	31, 605	2, 625, 107	61, 694	8, 570, 942	$263, 512
Lake trout	2, 369, 265	260, 619	557, 768	67, 776	322, 310	54, 020
Pike (jacks)	3, 803	48	12, 775	1, 609	74	5
Sauger	9, 333	1, 120				
Sucker "mullet"	106, 237	3, 200	128, 574	4, 218	2, 085	34
Sunfish			50	4		
Whitefish:						
Common	143, 354	17, 000	61, 880	8, 083	3, 297	708
Menominee	9, 768	684	9, 310	650	16, 452	1, 325
Yellow perch	3, 074	400	1, 482	180		
Yellow pike	23, 933	5, 500	15, 847	3, 593		
Total	4, 395, 119	331, 476	3, 837, 915	184, 174	8, 915, 160	319, 604

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[18] From streams tributary to Lake Michigan and Lake Huron.

Lake fisheries of the United States, 1929—Continued

CATCH: BY LAKES—Continued

Species	Lake Superior		Lake of the Woods, Rainy Lake, and Namakan Lake		Total, all lakes	
	Total		Minnesota			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					2, 834, 607	$188, 884
Bowfin					31, 780	1, 000
Buffalofish					1, 662	166
Burbot	53	$2	119, 919	$1, 045	611, 783	12, 415
Carp	1, 017	31	16, 925	677	2, 017, 520	69, 202
Catfish and bullheads	105	6	48, 595	3, 000	681, 796	72, 382
Chubs	570, 063	47, 628	266, 429	9, 500	5, 601, 439	589, 314
Cisco					127, 874	18, 856
Crappie			2, 540	500	2, 540	500
Eels					63, 111	5, 993
Goldeye			220	7	220	7
Goldfish					10, 380	415
Lake herring	12, 776, 285	356, 811			21, 098, 722	520, 914
Lake trout	3, 249, 343	382, 415	49	10	11, 949, 560	1, 744, 605
Mooneye					15, 751	675
Pike (jacks)	16, 652	1, 662	361, 668	18, 300	500, 341	32, 819
Rock bass					38, 680	2, 335
Sauger	9, 333	1, 120	41, 795	3, 315	1, 635, 696	129, 237
Sheepshead					2, 976, 399	74, 174
Smelt					221	47
Sturgeon			1, 428	500	7, 090	2, 858
Sucker "mullet"	236, 896	7, 452	241, 095	6, 000	5, 914, 902	250, 492
Sunfish	50	4			9, 061	547
Tullibee			573, 679	23, 200	573, 679	23, 200
White bass					155, 666	9, 330
Whitefish:						
Common	208, 531	25, 791	79, 281	10, 013	10, 131, 844	1, 688, 353
Menominee	35, 530	2, 659			532, 958	35, 433
Yellow perch	4, 556	580	30, 766	3, 076	8, 013, 196	465, 948
Yellow pike	39, 780	9, 093	770, 718	103, 000	2, 384, 268	393, 602
Crawfish					52, 200	4, 400
Mussels [18]					7, 414, 521	328, 782
Pearls and slugs [18]						20, 865
Total	17, 148, 194	835, 254	2, 555, 107	182, 143	85, 389, 467	6, 787, 750

[18] From streams tributary to Lake Michigan and Lake Huron.

INDUSTRIES RELATED TO THE FISHERIES

Transporting.—There were 77 persons in the Lake States engaged in the transporting of fish during 1929. In this trade 6 steam vessels and 30 motor vessels having a combined capacity of 584 net tons were operated.

Wholesale.—There were 151 wholesale establishments in the Lake States engaged primarily in handling fresh and frozen fishery products. These establishments employed 1,352 persons who received $2,468,520 in salaries and wages.

Manufacturing.—There were 33 establishments in the Lake States during 1929 engaged primarily in the manufacture of prepared fishery products or by-products. They employed 253 persons who received $277,146 in salaries and wages. The products manufactured, consisting principally of smoked, salted, and spiced fishery products, were valued at $1,817,054. In addition to the above, fishermen prepared products, mostly salted lake herring, valued at $211,671. Detailed statistics of most of the items manufactured may be obtained from Fisheries Document No. 1095, "Fishery Industries of the United States, 1929."

Industries related to the Lake fisheries of the United States, 1929

TRANSPORTING

Items	Pennsylvania	Ohio	Michigan	Wisconsin	Minnesota	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged on transporting vessels	3	9	14	27	24	77
Transporting vessels:						
Steam	1	2	------	1	2	6
Net tonnage	17	41	------	55	107	220
Motor	------	3	6	20	1	30
Net tonnage	------	29	96	177	62	364
Total	1	5	6	21	3	36
Total net tonnage	17	70	96	232	169	584

WHOLESALE

Items	New York	Pennsylvania	Ohio	Michigan	Illinois	Wisconsin	Minnesota	Total
Establishments	13	7	27	31	38	26	9	151
Persons engaged:								
Proprietors	19	11	38	47	73	41	14	243
Salaried employees	11	5	48	33	190	28	21	336
Wage earners	69	47	133	102	256	137	29	773
Paid to salaried employees	$26, 248	$41, 926	$141, 832	$94, 180	$846, 865	$52, 405	$57, 900	$1, 261, 356
Paid to wage earners	95, 334	44, 681	220, 114	121, 218	511, 156	176, 791	37, 870	1, 207, 164
Total salaries and wages	121, 582	86, 607	361, 946	215, 398	1, 358, 021	229, 196	95, 770	2, 468, 520

MANUFACTURING[1]

Items	Michigan		Illinois	
	Number		*Number*	
Establishments	8		6	
Persons engaged:				
Proprietors	12		11	
Salaried employees	4		6	
Wage earners	56		43	
Paid to salaried employees	$22, 920		$30, 960	
Paid to wage earners	58, 786		56, 680	
Total salaries and wages	81, 706		87, 640	
	Pounds	*Value*	*Pounds*	*Value*
Products:				
Smoked, salted, and spiced	1, 497, 040	$246, 405	2, 208, 400	$721, 180
Miscellaneous products and by-products	------	39, 725	------	------
Total products	------	286, 130	------	721, 180

Items	Wisconsin		Other States[2]		Total	
	Number		*Number*		*Number*	
Establishments	14		5		33	
Persons engaged:						
Proprietors	21		7		51	
Salaried employees	7		5		22	
Wage earners	45		36		180	
Paid to salaried employees	$14, 960		$26, 301		$95, 141	
Paid to wage earners	45, 139		21, 400		182. 005	
Total salaries and wages	60, 099		47, 701		277, 146	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Products:						
Smoked, salted, and spiced	3, 875, 334	$543, 569	946, 149	$239, 694	8, 526, 923	$1, 170, 848
Miscellaneous products and by-products	------	26, 389	------	92	------	66, 206
Total products	------	569, 958	------	239, 786	------	1, 817. 054

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[1] Includes the production of 2 firms in New York, 2 in Ohio, 6 in Michigan, 2 in Illinois, 13 in Wisconsin, and 2 in Minnesota whose principal activities were in the wholesale trade.

[2] New York, Ohio, Indiana, and Minnesota have been combined as "Other States" to avoid disclosure of private enterprise.

Industries related to the Lake fisheries of the United States, 1929—Continued

PRODUCTS PREPARED BY THE FISHERMEN

Items	Michigan		Indiana		Illinois	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salted:						
Lake herring	1,325,500	$48,650				
Caviar	3,381	1,352				
Total	1,328,881	50,002				
Smoked:						
Chubs	2,500	625	15,000	$3,900	122,700	$18,800
Lake trout	1,000	300	5,000	1,300	4,000	1,400
Whitefish	2,500	750				
Total	6,000	1,675	20,000	5,200	126,700	20,200
Grand total	1,334,881	51,677	20,000	5,200	126,700	20,200

Items	Wisconsin		Minnesota		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salted:						
Lake herring	248,871	$8,214	2,125,500	$76,480	3,699,871	$133,344
Caviar					3,381	1,352
Total	248,871	8,214	2,125,500	76,480	3,703,252	134,696
Smoked:						
Chubs	112,500	27,000	2,000	500	254,700	50,825
Lake herring			24,500	4,400	24,500	4,400
Lake trout	75,000	18,000			85,000	21,000
Whitefish					2,500	750
Total	187,500	45,000	26,500	4,900	366,700	76,975
Grand total	436,371	53,214	2,152,000	81,380	4,069,952	211,671

HISTORICAL REVIEW

Statistics of the catch of fishery products in the United States waters of the Great Lakes are available for various years from 1885 to 1908, inclusive, and for all the years from 1913 to 1929, inclusive. During these periods the catch has been marked by many fluctuations, reaching a peak in 1890 when the catch amounted to 113,899,000 pounds and registered the smallest catch on record in 1928 when 63,368,000 pounds were taken. In 1929 the catch amounted to 85,389,000 pounds.

Since 1913 records of the catch in the Canadian waters of the Great Lakes are available as well as those for the United States. During the 5-year period from 1916 to 1920, inclusive, an average catch of 129,162,000 pounds was registered for the Lakes, while that in 1929 amounted to 115,037,000 pounds. Comparative statistics for each of the species taken in the United States and Canada since 1913 are shown in the following tables:

Lake fisheries of the United States, 1885–1929

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Lake Ontario[1]	Lake Erie	Lake St. Clair and St. Clair and Detroit Rivers	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake[2]	Total
1885	3,398	51,457	2,186	11,457	23,518	8,826	(3)	99,842
1890	3,447	64,851	2,995	10,056	26,434	6,116	(3)	113,899
1893	928	42,969	1,814	12,064	30,748	8,097	(3)	96,620
1899	2,406	58,394	579	12,418	34,500	5,430	(3)	113,727
1903	1,245	23,189	522	14,455	33,579	13,205	(3)	86,195
1908	823	41,922	737	12,932	40,019	10,198	(3)	106,631
1913	210	22,120	(3)	11,184	26,994	6,417	1,384	68,309
1914	277	53,571	(3)	8,248	28,195	7,088	1,246	98,625
1915	395	59,509	(3)	10,245	31,680	5,694	1,425	108,948
1916	317	41,223	(3)	17,145	23,023	5,437	1,287	88,432
1917	656	41,416	(3)	12,512	29,317	9,889	2,103	95,893
1918	524	51,479	(3)	14,966	26,675	11,546	1,489	106,679
1919	472	35,154	(3)	15,240	29,820	10,500	1,277	92,463
1920	314	32,192	(3)	11,250	23,053	9,267	1,299	77,375
1921	1,855	46,731	(3)	9,330	17,018	7,476	1,048	83,458
1922	889	40.912	(3)	13,481	16,605	6,569	978	79,434
1923	710	44,378	(3)	9,920	15,358	7,584	1,159	79,109
1924	1,049	40,264	(3)	9,074	17,694	8,944	1,256	78,281
1925	446	26,639	(3)	6,567	21,710	12,307	1,463	69,132
1926	788	25.057	(3)	13,132	20,495	13,436	2,392	75,300
1927	698	23,796	(3)	15,711	23,681	15,302	2,139	81,327
1928	854	19,643	(3)	9,943	17,999	13,132	1,797	63,368
1929	948	18,647	(3)	10,477	35,615	17,148	2,555	85,390

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[1] Includes the catch in Lake Ontario proper and Chaumont Bay in the years from 1913 to 1924, inclusive; Lake Ontario proper in 1925, and Lake Ontario proper, Niagara River below the falls, St. Lawrence River and Chaumont, Black River, Port, Great Sodus and Little Sodus Bays, prior to 1913 and since 1925.

[2] Does not include the catch in Namakan and Rainy Lakes prior to 1926.

[3] Comparable data not available.

Lake fisheries of the United States and Canada, 1913 to 1929

CATCH: BY LAKES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Lake Ontario			Lake Erie			Lake Huron			Lake Michigan, United States
	United States[1]	Canada[2]	Total	United States	Canada	Total	United States	Canada	Total	
Average, 1913–1915	294	3,711	4,005	45,067	18,691	63,758	9,892	6,739	16,631	28,956
Average, 1916–1920	457	5,193	5,650	40,293	16,363	56,656	14,222	6,760	20,982	26,378
Average, 1921–1925	990	4,778	5,768	39,785	16,384	56,169	9,674	7,072	16,746	17,677
1926	788	4,227	5,015	25,057	8,752	33,809	13,132	7,483	20,615	20,495
1927	698	3,842	4,540	23,796	10,069	33,865	15,711	8,864	24,575	23,681
1928	854	3,589	4,443	19,643	10,295	29,938	9,943	7,798	17,741	17,999
1929	948	3,691	4,639	18,647	11,260	29,907	10,477	7,456	17,933	35,615

Year	Lake Superior			Lake of the Woods, Rainy Lake, and Namakan Lake			Total		
	United States	Canada	Total	United States[3]	Canada[4]	Total	United States	Canada	Total
Average, 1913–1915	6.400	3,654	10.054	1,352	3,816	5,168	91,961	36,611	128,572
Average, 1916–1920	9,328	5,959	15,287	1,491	2,718	4,209	92,169	36,993	129,162
Average, 1921–1925	8,576	3,828	12,404	1,181	3,013	4,194	77,883	35,075	112,958
1926	13,436	4,311	17,747	2,392	2,725	5,117	75,300	27,498	102,798
1927	15,302	5,152	20,454	2,139	2,699	4,838	81,327	30,626	111,953
1928	13,132	5,401	18,533	1,797	2,202	3,999	63,368	29,285	92,653
1929	17,148	4,857	22,005	2,555	2,173	4,728	85,390	29,437	114,827

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[1] Includes the catch of Lake Ontario proper and Chaumont Bay in the years from 1913 to 1924, inclusive. Lake Ontario proper in 1925; and Lake Ontario proper, Niagara River below the falls, St. Lawrence River, and Chaumont, Black River, Port, Great Sodus and Little Sodus Bays for the years since 1925.

[2] Includes the catch in the Niagara River below the falls.

[3] Does not include the catch in Namakan and Rainy Lakes prior to 1926.

[4] Includes the catch in Lac Suel, Eagle Lake, etc., in the interior of Canada, prior to 1926.

NOTE.—The catch in the Detroit River, St. Clair River, and Lake St. Clair are not included in these statistics.

Lake fisheries of the United States and Canada, 1913 to 1919—Continued

CATCH: BY SPECIES

[Expressed in thousands of pounds; that is, 000 omitted]

Year	Blue pike			Burbot: United States [1]	Carp			Catfish and bullheads		
	United States	Canada	Total		United States	Canada	Total	United States	Canada	Total
Average, 1913–1915	10,710	2,779	13,489	[2] 65	8,084	1,092	9,176	531	386	917
Average, 1916–1920	3,616	1,932	5,548	[2] 347	5,308	860	5,898	1,206	348	1,554
Average, 1921–1925	9,695	4,492	14,187	320	4,097	433	4,530	845	249	1,094
1926	9,362	3,031	12,393	373	4,649	292	4,941	910	173	1,083
1927	7,324	3,087	10,411	511	3,669	327	3,996	815	151	966
1928	4,842	2,145	6,987	584	1,242	396	1,638	503	301	804
1929	2,835	2,552	5,387	612	2,018	359	2,377	682	320	1,002

Year	Chubs			Cisco			Lake herring			Sauger: United States [1]
	United States	Canada	Total	United States	Canada	Total	United States	Canada	Total	
Average, 1913–1915	4,321	397	4,718	14,200	7,721	21,921	14,479	2,676	17,155	3,450
Average, 1916–1920	5,250	482	5,732	18,764	9,996	28,760	19,429	4,396	23,825	3,642
Average, 1921–1925	3,163	267	3,430	14,805	6,904	21,709	12,228	1,525	13,753	3,384
1926	6,069	973	7,042	1,449	1,573	3,022	16,522	2,807	19,329	1,634
1927	6,616	1,375	7,991	2,350	2,309	4,659	22,177	3,474	25,651	1,246
1928	5,031	801	5,832	618	1,273	1,891	14,937	4,016	18,953	1,596
1929	5,601	313	5,914	128	361	489	21,099	4,503	25,602	1,636

Year	Lake trout			Pike (jacks)			Sturgeon			Sheepshead: United States [1]
	United States	Canada	Total	United States	Canada	Total	United States	Canada	Total	
Average, 1913–1915	10,554	5,590	16,144	509	3,381	3,890	84	204	288	1,697
Average, 1916–1920	10,559	5,744	16,303	456	1,373	1,829	62	102	164	2,503
Average, 1921–1925	10,510	6,262	16,772	376	1,117	1,493	27	93	120	2,114
1926	11,559	6,433	17,992	302	952	1,254	38	84	122	1,325
1927	10,493	7,077	17,570	398	1,099	1,497	41	77	118	4,361
1928	9,418	6,415	15,833	531	964	1,495	30	76	367	2,934
1929	11,949	6,039	17,988	500	937	1,437	7	60	67	2,976

Year	Sucker "mullet": United States [1]	Tullibees			White bass: United States [1]	Whitefish, common			Whitefish, Menominee: United States [1]
		United States	Canada	Total		United States	Canada	Total	
Average, 1913–1915	4,566	(3)	819	(3)	566	4,545	5,322	9,867	(4)
Average, 1916–1920	4,627	(3)	185	(3)	305	4,900	5,551	10,451	(4)
Average, 1921–1925	3,300	(3)	215	(3)	484	3,799	6,038	9,837	(4)
1926	4,122	990	164	1,154	158	5,148	4,800	9,948	(4)
1927	4,765	662	106	768	126	5,463	4,792	10,255	(4)
1928	3,995	220	46	266	286	6,431	4,392	10,823	460
1929	5,915	574	200	774	156	10,132	4,441	14,573	533

Year	Yellow perch			Yellow pike			Miscellaneous fish		
	United States	Canada	Total	United States	Canada	Total	United States	Canada	Total
Average, 1913–1915	5,974	1,383	7,357	2,725	3,024	5,749	4,906	2,467	7,373
Average, 1916–1920	4,995	1,521	6,516	3,002	1,663	4,665	3,465	2,842	6,307
Average, 1921–1925	3,960	2,360	6,320	2,569	2,355	4,924	2,147	2,768	4,915
1926	5,407	1,956	7,363	2,828	1,623	4,451	2,455	2,637	5,092
1927	4,995	2,727	7,722	3,025	1,553	4,578	2,290	2,472	4,762
1928	5,784	4,598	10,382	2,926	1,409	4,335	1,001	2,452	3,453
1929	8,013	5,905	13,918	2,384	1,317	3,701	----------	2,057	2,057

[1] The Canadian catch of these species has been included with "Miscellaneous fish."
[2] The catch for Lake Huron was included with "Miscellaneous fish" prior to 1919.
[3] The catch for the United States was included with other classifications prior to 1925.
[4] Included with "Miscellaneous fish" prior to 1928.

MUSSEL-SHELL INDUSTRY OF THE LAKE FISHERIES

Statistics of the mussel-shell industry of the lake fisheries were obtained for the year 1929 for the first time since they were collected as a part of the complete survey of the Great Lakes for 1922. The mussel-shell industry employed 988 fishermen during 1929 as compared with 563 in 1922. The value of the catch of mussel shells and pearls and slugs amounted to $349,647, which is an increase of 50 per cent as compared with the value of the catch in 1922. The catch of mussel shells amounted to 7,414,521 pounds, valued at $328,782, which is an increase of 19 per cent in the catch and 51 per cent in the value of the catch as compared with the catch and its value in 1922. The value of the catch of pearls and slugs was $20,865, which is an increase of 33 per cent as compared with the value in 1922. Considered according to value, mussel shells were by far the most important product, accounting for 94 per cent of the total value of the catch.

OPERATING UNITS

The catch of fishery products in the mussel-shell industry of the lake fisheries was taken by 988 fishermen, 545 motor boats, 261 other small boats, 689 pairs of crowfoot bars, 110 tongs, 422 forks, 10 rakes, and 234 picks.

The 10 rivers tributary to Lake Michigan accounted for over 99 per cent of the total number of fishermen employed and for over 99 per cent of the boats operated. The single river tributary to Lake Huron accounted for the remainder.

Grand River accounted for 51 per cent of the total number of fishermen employed and for 50 per cent of the boats operated. St. Joseph River accounted for 25 per cent of the fishermen and 26 per cent of the boats. Muskegon River accounted for 10 per cent of the fishermen and 7 per cent of the boats. All these rivers are tributary to Lake Michigan.

Michigan accounted for 87 per cent of the total number of fishermen employed and for 85 per cent of the boats operated. Indiana accounted for 10 per cent of the fishermen and 11 per cent of the boats, and Wisconsin accounted for 3 per cent of the fishermen and for 4 per cent of the boats.

CATCH

Three types of gear accounted for 95 per cent of the fishery products taken in the mussel-shell industry of the Lake fisheries during 1929. By far the most important of these gears were crowfoot bars, which accounted for 67 per cent of the catch and 67 per cent of the value of the catch. Ranked next in order were forks, which accounted for 18 per cent of the catch and 18 per cent of the value of the catch. Picks were third, accounting for 10 per cent of the catch and 10 per cent of the value of the catch.

The 10 rivers tributary to Lake Michigan accounted for 99 per cent of the catch and 99 per cent of the value of the catch. The single river tributary to Lake Huron accounted for the remainder.

Grand River accounted for 54 per cent of the total catch and 55 per cent of the total value. St. Joseph River accounted for 19 per cent of the catch and 19 per cent of the value. Muskegon River accounted for 11 per cent of the catch and 11 per cent of the value. All these rivers are tributary to Lake Michigan.

The fisheries of the mussel-shell industry were prosecuted in 4 rivers in Michigan, 4 in Wisconsin, 2 in Indiana, and 1 in both Michigan and Indiana. Michigan accounted for 88 per cent of the total catch and 91 per cent of the total value. Indiana accounted for 7 per cent of the catch and 6 per cent of the value, and Wisconsin accounted for 5 per cent of the catch and 3 per cent of the value.

BUTTON BLANK MANUFACTURING

There were four establishments in the mussel-shell industry of the Lake fisheries engaged in the manufacture of mussel-shell products during 1929. They employed 42 persons, who received $37,218 in salaries and wages. The products manufactured consisted of button blanks, valued at $47,669, and miscellaneous products, valued at $1,125.

Mussel-shell industry of the Lake fisheries, 1929

OPERATING UNITS

Items	Lake Michigan								
	St. Joseph River			Grand River[1]	Kalamazoo River	Muskegon River	Elkhart River	Pigeon River	Fox River
	Michigan	Indiana	Total	Michigan	Michigan	Michigan	Indiana	Indiana	Wisconsin
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen, on boats and shore	200	51	251	500	50	100	22	25	1
Boats:									
Motor	108	16	124	300	38	35	10	10	12
Other	60	25	85	100	12	25	12	15	3
Apparatus:									
Crowfoot bars (pairs)	100	26	126	400	45	70	10	13	12
Tongs	10		10	100					
Forks		25	25	300	25	20	12	12	10
Rakes	10		10						
Picks	125	25	150		30	30	12	12	

Items	Lake Michigan				Lake Huron	Total all rivers			Grand Total
	Grand River	Waupaca River	Wolf River	Total	Cass River				
	Wisconsin	Wisconsin	Wisconsin		Michigan	Michigan	Indiana	Wisconsin	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen, on boats and shore	1	3	15	982	6	856	98	34	988
Boats:									
Motor		3	10	542	3	484	36	25	545
Other	1		5	258	3	200	52	9	261
Apparatus:									
Crowfoot bars (pairs)		3	10	689		615	49	25	689
Tongs				110		110			110
Forks	1	3	8	416	6	351	49	22	422
Rakes				10		10			10
Picks				234		185	49		234

[1] Includes Maple and Thornapple Rivers, tributaries of Grand River.

Mussel-shell industry of the Lake fisheries, 1929—Continued

CATCH

Gear and products	Lake Michigan							
	St. Joseph River						Grand River,[1] Mich.	
	Michigan		Indiana		Total			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
By crowfoot bars:								
Mussel shells	600,000	$27,600	129,000	$4,338	729,000	$31,938	3,000,000	$138,000
Pearls and slugs	----------	1,500	----------	900	----------	2,400	----------	7,500
By tongs:								
Mussel shells	10,000	460	----------	----------	10,000	460	250,000	11,500
Pearls and slugs	----------	25	----------	----------	----------	25	----------	1,000
By forks:								
Mussel shells	----------	----------	64,500	2,169	64,500	2,169	750,000	34,500
Pearls and slugs	----------	----------	----------	450	----------	450	----------	1,500
By rakes:								
Mussel shells	10,000	460	----------	----------	10,000	460	----------	----------
Pearls and slugs	----------	50	----------	----------	----------	50	----------	----------
By picks:								
Mussel shells	500,000	23,000	43,000	1,446	543,000	24,446	----------	----------
Pearls and slugs	----------	1,200	----------	300	----------	1,500	----------	----------
By hand:								
Mussel shells	30,000	1,380	21,500	723	51,500	2,103	----------	----------
Pearls and slugs	----------	100	----------	150	----------	250	----------	----------
Total all apparatus:								
Mussel shells	1,150,000	52,900	258,000	8,676	1,408,000	61,576	4,000,000	184,000
Pearls and slugs	----------	2,875	----------	1,800	----------	4,675	----------	10,000

Gear and products	Lake Michigan—Continued									
	Kalamazoo River, Mich.		Muskegon River, Mich.		Elkhart River, Ind.		Pigeon River, Ind.		Fox River, Wis.	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
By crowfoot bars:										
Mussel shells	350,000	$15,750	533,335	$25,335	74,000	$2,685	55,000	$2,009	73,484	$2,438
Pearls and slugs	--------	800	--------	1,200	--------	518	--------	385	--------	200
By forks:										
Mussel shells	70,000	3,150	177,665	8,365	37,000	1,342	27,600	1,004	36,742	1,219
Pearls and slugs	--------	200	--------	600	--------	259	--------	192	--------	75
By picks:										
Mussel shells	60,000	2,700	89,000	4,300	24,667	895	18,334	669	--------	------
Pearls and slugs	--------	200	--------	200	--------	173	--------	128	--------	------
By hand:										
Mussel shells	20,000	900	--------	--------	12,333	447	9,166	335	--------	------
Pearls and slugs	--------	50	--------	--------	--------	86	--------	64	--------	------
Total all apparatus:										
Mussel shells	500,000	22,500	800,000	38,000	148,000	5,369	110,100	4,017	110,226	3,657
Pearls and slugs	--------	1,250	--------	2,000	--------	1,036	--------	769	--------	275

Gear and products	Lake Michigan—Continued							
	Grand River, Wis.		Waupaca River, Wis.		Wolf River, Wis.		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
By crowfoot bars:								
Mussel shells	--------	--------	26,355	$610	122,323	$2,755	4,963,497	$221,520
Pearls and slugs	--------	--------	--------	100	----------	250	------------	13,353
By tongs:								
Mussel shells	--------	--------	--------	--------	----------	--------	260,000	11,960
Pearls and slugs	--------	--------	--------	--------	----------	--------	------------	1,025
By forks:								
Mussel shells	1,000	$60	26,355	610	61,162	1,378	1,253,024	53,797
Pearls and slugs	--------	10	--------	50	----------	200	------------	3,536
By rakes:								
Mussel shells	--------	--------	--------	--------	----------	--------	10,000	460
Pearls and slugs	--------	--------	--------	--------	----------	--------	------------	50
By picks:								
Mussel shells	--------	--------	--------	--------	----------	--------	735,001	33,010
Pearls and slugs	--------	--------	--------	--------	----------	--------	------------	2,201
By hand:								
Mussel shells	--------	--------	--------	--------	----------	--------	92,999	3,785
Pearls and slugs	--------	--------	--------	--------	----------	--------	------------	450
Total all apparatus:								
Mussel shells	2,000	60	52,710	1,220	183,485	4,133	7,314,521	324,532
Pearls and slugs	--------	10	--------	150	----------	450	------------	20,615

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[1] Includes Maple and Thornapple Rivers, tributaries of Grand River.

Mussel-shell industry of the Lake fisheries, 1929—Continued

CATCH—Continued

Gear and products	Lake Huron—Cass River, Mich.		Total, all rivers						Grand total	
			Michigan		Indiana		Wisconsin			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
By crowfoot bars:										
Mussel shells			4,483,335	$206,685	258,000	$9,032	222,162	$5,803	4,963,497	$221,520
Pearls and slugs				11,000		1,803		550		13,353
By tongs:										
Mussel shells			260,000	11,960					260,000	11,960
Pearls and slugs				1,025						1,025
By forks:										
Mussel shells	100,000	$4,250	1,097,665	50,265	129,100	4,515	126,259	3,267	1,353,024	58,047
Pearls and slugs		250		2,550		901		335		3,786
By rakes:										
Mussel shells			10,000	460					10,000	460
Pearls and slugs				50						50
By picks:										
Mussel shells			649,000	30,000	86,001	3,010			735,001	33,010
Pearls and slugs				1,600		601				2,201
By hand:										
Mussel shells			50,000	2,280	42,999	1,505			92,999	3,785
Pearls and slugs				150		300				450
Total all apparatus:										
Mussel shells	100,000	4,250	6,550,000	301,650	516,100	18,062	348,421	9,070	7,414,521	328,782
Pearls and slugs		250		16,375		3,605		885		20,865

BUTTON BLANK MANUFACTURING [2]

Items	Number	Value
Establishments	4	
Persons engaged:		
Proprietors	3	
Salaried employees	1	
Wage earners	38	
Paid to salaried employees		$2,000
Paid to wage earners		35,218
Total, salaries and wages		37,218
Products:		
Button blanks, gross	252,250	47,669
By-products:		
Miscellaneous		1,125

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[2] These data also included in the manufacturing table of "Industries related to the fisheries of the Lakes Section."

FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES

The latest statistical canvass made of the fisheries and fishery industries of the Mississippi River and tributaries was for the calendar year 1922. The complete statistics for the canvass were published in the report of the division of fishery industries for 1923 and in Statistical Bulletin No. 607. During 1922 the fisheries and fishery industries of this region employed 19,122 persons, and the yield of the fisheries amounted to 105,733,734 pounds, valued at $4,503,521.

Of the total catch in 1922 by far the most important product was fresh-water mussel shells which alone amounted to 51,768,173 pounds, valued at $1,050,592. This represents 49 per cent of the total weight and 23 per cent of the total value of the catch. A survey of the fresh-water mussel-shell fishery for 1929 shows a production of 46,937,479 pounds, valued at $996,137, for the Mississippi River and tributaries.

Catch of the fisheries of the Mississippi River and tributaries, 1922, with the total catch for certain previous years

Species	Total	
	Pounds	*Value*
Black bass	73, 554	$10, 874
Bowfin	190, 073	6, 078
Buffalofish	17, 267, 177	1, 013, 692
Carp, German	18, 338, 371	872, 128
Catfish and bullheads	8, 092, 690	713, 461
Crappie	512, 423	49, 338
Drum, fresh-water, or sheepshead	5, 260, 892	290, 480
Eels	16, 060	1, 057
Mooneye or toothed herring	3, 450	166
Paddlefish, or spoonhill cat	1, 398, 991	132, 545
Paddlefish caviar	12, 398	29, 546
Pike and pickerel	20, 100	1, 850
Pike perch (sauger)	4, 745	768
Pike perch (wall-eyed)	24, 650	3, 750
Quillback, or American carp	765, 389	59, 221
Rock bass	2, 738	312
Sturgeon, lake	10, 953	1, 369
Sturgeon, shovelnose	227, 365	19, 323
Sturgeon, shovelnose, caviar	1, 880	2, 615
Sturgeon, shovelnose, eggs	449	764
Suckers	699, 539	$63, 028
Sunfish	374, 533	24, 955
White bass	64, 624	5, 500
Yellow bass	7, 500	600
Yellow perch	22, 250	1, 904
Other fish	73, 275	4, 917
Shrimp	147, 482	14, 570
Crawfish	7, 890	759
Frogs	231, 761	20, 410
Turtles	96, 743	2, 772
Alligator hides	15, 616	2, 673
Mussel shells	51, 768, 173	1, 050, 592
Pearls	----------	46, 124
Slugs	----------	55, 380
Total	105, 733, 734	4, 503, 521
1894 (all species)	44, 544, 828	1, 384, 574
1899 (all species)	96, 797, 437	1, 781, 029
1903 (all species)	93, 374, 159	1, 841, 168

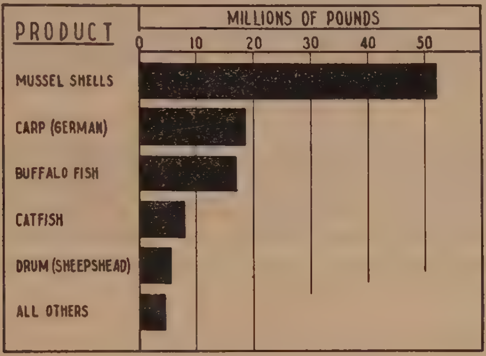

FIGURE 22.—Yield of principal fishery products in the Mississippi River and tributaries, 1922

FRESH-WATER MUSSEL-SHELL FISHERY

During 1930 the catch of fresh-water mussel shells in the United States amounted to 59,490,000 pounds, valued at $1,092,156. This represents an increase of 9 per cent in quantity but a decrease of 18 per cent in value, as compared with the catch and its value in 1929.

Arkansas was the most important producing State during 1930, accounting for 31 per cent of the total catch. Illinois ranked second with 14 per cent. Other important producing States were Tennessee, 13 per cent; Indiana, 9 per cent; Michigan, 8 per cent; Iowa, 6 per cent; Kentucky, 4 per cent; and Alabama and Wisconsin, each, 3 per cent.

Catch of the fresh-water mussel-shell fishery of the United States, 1930

State	Pounds	Value
Alabama	1, 824, 000	$27, 646
Arkansas	18, 452, 000	304, 140
Illinois	8, 380, 000	160, 112
Indiana	5, 294, 000	117, 803
Iowa	3, 616, 000	68, 827
Kansas	166, 000	2, 648
Kentucky	2, 476, 000	39, 209
Louisiana	1, 364, 000	29, 859
Michigan	4, 738, 000	113, 771
Minnesota	968, 000	17, 169
Mississippi	528, 000	$11, 445
Missouri	190, 000	2, 696
Ohio	1, 158, 000	30, 234
South Dakota	300, 000	4, 427
Tennessee	7, 448, 000	117, 531
Texas	846, 000	15, 398
Wisconsin	1, 742, 000	29, 241
Total	59, 490, 000	1, 092, 156

LAKE PEPIN

The fisheries of Lake Pepin, exclusive of those prosecuted for mussel shells, employed 111 fishermen in 1930 as compared with 54 in 1929. The catch amounted to 388,010 pounds, valued at $23,055—a decrease of 1 per cent in the catch and 27 per cent in the value of the catch as compared with the catch and its value for 1929. Compared with 1922, there was a decrease of 89 per cent in the catch. German carp was by far the most important species taken in this lake, constituting 67 per cent of the total catch and 56 per cent of the value of the catch. Fresh-water drum or sheepshead was second in importance, accounting for 16 per cent of the catch and 19 per cent of the value. Other species of considerable importance were catfish and bullheads, and buffalofish.

OPERATING UNITS BY GEAR

In 1930 the catch of fishery products of Lake Pepin was taken by 39 regular fishermen, 72 casual fishermen, 41 motor boats, 87 other small boats, 18 haul seines having a combined length of 11,433 yards, 7 gill nets having a combined length of 5,300 yards, 1 line with 300 hooks, 106 pound nets, 76 fyke nets, and 3 spears.

CATCH BY GEAR

Two types of gear accounted for 92 per cent of the catch of fishery products taken in this lake during 1930. By far the most important of these were haul seines, which accounted for 65 per cent of the catch and 57 per cent of the value of the catch. Ranked next in importance were pound nets, which accounted for 27 per cent of the catch and 36 per cent of the value of the catch.

OPERATING UNITS BY STATES AND COUNTIES

Wisconsin accounted for 93 per cent of the total number of fishermen employed in the fisheries of Lake Pepin during 1930. Pepin County, Wis., ranked foremost in this respect, accounting for 60 per cent. Wisconsin also accounted for 94 per cent of the fishing boats. Pepin County, Wis., alone accounted for 52 per cent.

CATCH BY STATES AND COUNTIES

The fisheries of Lake Pepin were prosecuted in two counties in Minnesota and two in Wisconsin during 1930. Pepin County, Wis., accounted for 40 per cent of the total catch and 48 per cent of the value of the catch. Pierce County, in the same State, accounted for 46 per cent of the total catch and 40 per cent of the value.

Fisheries of Lake Pepin, 1930

OPERATING UNITS AND CATCH: BY GEAR

Items	Haul seines		Gill nets		Lines		Pound nets	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
Regular	21		5		1		14	
Casual	36		7				30	
Total	57		12		1		44	
Boats:								
Motor	19		7				14	
Other	55		8		1		28	
Apparatus:								
Number	18		7		1		106	
Length, yards	11,433		5,300					
Hooks					300			
SPECIES	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	2,450	$45					6,000	$120
Buffalofish	9,300	740	100	$10			9,000	800
Carp:								
German	214,000	10,700	7,880	394	120	$6	18,000	900
American or quillback							4,000	120
Catfish and bullheads	2,300	452			50	10	14,000	2,800
Drum, fresh-water, or sheepshead	13,600	980					47,000	3,300
Mooneye							1,000	50
Suckers	8,500	230					7,000	200
Turtles							300	10
Total	250,150	13,147	7,980	404	170	16	106,300	8,300

Items	Fyke nets		Spears		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
Regular	7				39	
Casual	10		3		72	
Total	17		3		111	
Boats:						
Motor	8		1		41	
Other	8		3		87	
Apparatus:						
Number	76		3			
SPECIES	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	2,000	$40			10,450	$205
Buffalofish	300	24	60	$5	18,760	1,579
Carp:						
German	17,200	860	2,500	125	259,700	12,985
American or quillback					4,000	120
Catfish and bullheads	450	90			16,800	3,352
Drum, fresh-water, or sheepshead	400	32			61,000	4,312
Mooneye					1,000	50
Suckers	500	12			16,000	442
Turtles					300	10
Total	20,850	1,058	2,560	130	388,010	23,055

Fisheries of Lake Pepin, 1930—Continued

OPERATING UNITS: By States and counties

Items	Minnesota			Wisconsin			Total for Lake
	Goodhue County	Wabasha County	Total	Pepin County	Pierce County	Total	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
Regular	4	1	5	24	10	34	39
Casual		3	3	43	26	69	72
Total	4	4	8	67	36	103	111
Boats:							
Motor	2	1	3	24	14	38	41
Other	2	3	5	43	39	82	87
Apparatus:							
Haul seines	2	1	3	6	9	15	18
Length, yards	833	1,000	1,833	3,300	6,300	9,600	11,433
Gill nets				5	2	7	7
Length, yards				4,000	1,300	5,000	5,300
Lines					1	1	1
Hooks					300	300	300
Pound nets				106		106	106
Fyke nets				10	66	76	76
Spears					3	3	3

CATCH: By States and counties

Species	Minnesota					
	Goodhue County		Wabasha County		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	200	$2	50	$1	250	$3
Buffalofish			1,000	80	1,000	80
Carp, German	24,000	1,200	13,000	650	37,000	1,850
Catfish and bullheads			100	12	100	12
Drum, fresh-water, or sheepshead			9,000	640	9,000	640
Suckers			6,000	150	6,000	150
Total	24,200	1,202	29,150	1,533	53,350	2,735

Species	Wisconsin						Total for lake	
	Pepin County		Pierce County		Total			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	6,100	$122	4,100	$80	10,200	$202	10,450	$205
Buffalofish	15,100	1,290	2,660	209	17,760	1,499	18,760	1,579
Carp:								
German	57,200	2,860	165,500	8,275	222,700	11,135	259,700	12,985
American or quillback	4,000	120			4,000	120	4,000	120
Catfish and bullheads	14,900	2,980	1,800	360	16,700	3,340	16,800	3,352
Drum, fresh-water, or sheepshead	50,000	3,510	2,000	162	52,000	3,672	61,000	4,312
Mooneye	1,000	50			1,000	50	1,000	50
Suckers	7,200	210	2,800	82	10,000	292	16,000	442
Turtles	300	10			300	10	300	10
Total	155,800	11,152	178,860	9,168	334,660	20,320	388,010	23,055

Operating units and catch of Lake Pepin, 1914 to 1930

Items	1914	1917	1922	1927	1928	1929	1930
OPERATING UNITS	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen	135	126	219	139	124	54	111
Boats:							
Motor	28	35	109	39	43	35	41
Other	54	55	136	105	98	73	87
Fishing apparatus:							
Haul seines	14	17	33	23	27	19	18
Gill nets	664	371	351	152	127	81	7
Lines	--------	--------	--------	--------	5	8	1
Pound nets	8	14	--------	--------	67	47	106
Fyke nets	295	262	95	280	100	101	76
Spears	--------	--------	7	4	2	3	3
SPECIES	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bowfin	1, 534	24, 021	16, 136	3, 334	8, 477	9, 320	10, 450
Buffalofish	261, 250	300, 808	340, 309	33, 449	23, 992	20, 071	18, 760
Carp:							
German	237, 517	467, 588	2, 578, 916	615, 242	488, 023	250, 902	259, 700
American or quillback	60, 605	14, 238	47, 377	4, 835	2, 839	1, 681	4, 000
Catfish and bullheads	26, 830	254, 249	127, 384	53, 076	52, 356	20, 272	16, 800
Drum, fresh-water, or sheepshead	131, 785	118, 304	395, 592	113, 793	101, 582	62, 904	61, 000
Eels	--------	--------	541	318	235	--------	--------
Mooneye:							
Fresh	9, 300	7, 656	--------	8, 976	1, 600	--------	1, 000
Smoked	1, 465	7, 250	--------	--------	--------	--------	--------
Paddlefish, or spoonbill cat	8, 877	2, 923	15, 971	1, 191	7, 909	685	--------
Pike (grass)	50	--------	--------	--------	--------	--------	--------
Sturgeon:							
Lake	1, 067	512	5, 253	--------	--------	--------	--------
Shovelnose	--------	--------	1, 080	--------	--------	--------	--------
Suckers	18, 340	15, 260	43, 466	31, 911	33, 645	24, 561	16, 000
Sunfish	50	--------	--------	--------	--------	--------	--------
Turtles	--------	--------	442	--------	--------	300	300
Total	758, 670	1, 212, 809	3, 572, 467	866, 125	720, 658	390, 696	388, 010

LAKE KEOKUK

The fisheries of Lake Keokuk, exclusive of those for mussel shells, employed 62 fishermen during 1930 as compared with 55 in 1929. The catch amounted to 241,710 pounds, valued at $20,251, which is a decrease of 31 per cent in the catch and 21 per cent in the value of the catch as compared with the catch and its value for 1929. Compared with 1922, there has been a decrease of 66 per cent in the catch. Considered according to the value of the catch, catfish and bullheads were by far the most important fish taken, accounting for 24 per cent of the catch and 56 per cent of the value of the catch. German carp ranked next with 51 per cent of the catch and 25 per cent of the value of the catch. Fresh-water drum or sheepshead ranked third with 15 per cent of the catch and 12 per cent of the value of the catch. Buffalofish, the only other species of importance, accounted for 10 per cent of the catch and 7 per cent of the value of the catch.

OPERATING UNITS BY GEAR

The catch of fishery products of Lake Keokuk was taken by 26 regular fishermen, 36 casual fishermen, 33 motor boats, 58 other small boats, 8 haul seines having a combined length of 2,198 yards, 10 lines with 6,200 hooks, 877 fyke nets, and 195 baskets.

CATCH BY GEAR

Three types of gear accounted for 92 per cent of the catch of fishery products taken in this lake during 1930. By far the most important of these gears were fyke nets, which accounted for 66 per cent of the catch and 68 per cent of the value of the catch. Ranked next in order were haul seines, which accounted for 13 per cent of the catch and 8 per cent of the value, while baskets accounted for 13 per cent of the catch also and 17 per cent of the value.

OPERATING UNITS BY STATES AND COUNTIES

Iowa accounted for 69 per cent of the total number of fishermen employed in the fisheries of Lake Keokuk. Des Moines County, Iowa, accounted for 60 per cent of the total number of fishermen. The entire activities in Illinois were confined to Hancock County, which accounted for 31 per cent of the total number of fishermen. Des Moines County, Iowa, accounted for 58 per cent of the boats operated. Hancock County, Ill., accounted for 32 per cent.

CATCH BY STATES AND COUNTIES

The fisheries of Lake Keokuk were prosecuted in one county in Illinois and two in Iowa during 1930. Hancock County, Ill., accounted for 49 per cent of the catch and 60 per cent of the value of the catch, and Des Moines County, Iowa, accounted for 37 per cent of the catch and 27 per cent of the value of the catch.

Fisheries of Lake Keokuk, 1930

OPERATING UNITS AND CATCH: BY GEAR

Items	Haul seines		Lines		Fyke nets		Baskets		Total, exclusive of duplication	
OPERATING UNITS										
Fishermen:	*Number*		*Number*		*Number*		*Number*		*Number*	
Regular	6		------		21		3		26	
Casual	5		10		22		------		36	
Total	11		10		43		3		62	
Boats:										
Motor	5		2		28		1		33	
Other	8		9		43		1		58	
Apparatus:										
Number	8		10		877		195		------	
Length, yards	2, 198		------		------		------		------	
Hooks	------		6, 200		------		------		------	
SPECIES	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	------	------	------	------	400	$8	------	------	400	$8
Buffalofish	2, 500	$150	1, 450	$87	18, 800	1, 038	800	$48	23, 550	1, 323
Carp: German	24, 000	960	14, 200	568	72, 750	2, 930	13, 000	520	123, 950	4, 978
Catfish and bullheads	1, 300	260	3, 300	660	39, 460	7, 892	13, 100	2, 620	57, 160	11, 432
Drum, fresh-water, or sheepshead	4, 700	329	------	------	26, 650	1, 795	5, 000	350	36, 350	2, 474
Paddlefish or spoonbill cat	------	------	------	------	300	36	------	------	300	36
Total	32, 500	1, 699	18, 950	1, 315	158, 360	13, 699	31, 900	3, 538	241, 710	20, 251

Fisheries of Lake Keokuk, 1930—Continued

OPERATING UNITS: BY STATES AND COUNTIES

Items	Illinois, Hancock County	Iowa			Total for lake
		Des Moines County	Lee County	Total	
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
Regular	9	14	3	17	26
Casual	10	23	3	26	36
Total	19	37	6	43	62
Boats:					
Motor	11	19	3	22	33
Other	18	34	6	40	58
Apparatus:					
Haul seines		5	3	8	8
Length, yards		698	1,500	2,198	2,198
Lines	10				10
Hooks	6,200				6,200
Fyke nets	607	238	32	270	877
Baskets	195				195

CATCH: BY STATES AND COUNTIES

Species	Illinois		Iowa						Total for lake	
	Hancock County		Des Moines County		Lee County		Total			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			400	$8			400	$8	400	$8
Buffalofish	5,150	$309	11,750	615	6,650	$399	18,400	1,014	23,550	1,323
Carp: German	54,100	2,164	52,100	2,104	17,750	710	69,850	2,814	123,950	4,978
Catfish and bullheads	43,300	8,660	8,360	1,672	5,500	1,100	13,860	2,772	57,160	11,432
Drum, fresh-water, or sheepshead	15,000	1,050	15,650	1,025	5,700	399	21,350	1,424	36,350	2,474
Paddlefish or spoonbill cat			300	36			300	36	300	36
Total	117,550	12,183	88,560	5,460	35,600	2,608	124,160	8,068	241,710	20,251

Operating units and catch of Lake Keokuk, 1914 to 1930

Items	1914	1917	1922	1927	1928	1929	1930
OPERATING UNITS	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen	105	118	122	102	85	55	62
Boats:							
Motor	36	52	58	70	56	50	33
Other	94	80	111	82	70	49	58
Fishing apparatus:							
Haul seines		1	2	3	4	5	8
Gill nets		12	235	26	30		
Trammel nets	14	17	17				
Lines [1]					13	28	10
Pound nets		81		815	7	4	
Fyke nets	1,378	1,368	1,301	1,594	1,547	1,485	877
Dip nets			1				
Baskets					692	833	195
SPECIES	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Black bass	15	4,163	6,200				
Bowfin		26,000		14,055	13,707	9,180	400
Buffalofish	249,900	696,543	113,946	67,872	36,498	42,920	23,550
Carp:							
German	302,365	762,259	276,431	291,199	281,419	178,380	123,950
American or quillback		5,936		9,880	11,467	5,700	
Catfish and bullheads	71,535	109,904	183,919	140,343	163,576	73,730	57,160
Crappie	70	17,560	13,770				
Drum, fresh-water, or sheepshead	26,860	160,554	65,040	27,538	16,809	38,930	36,350
Eels	3,800	2,087					
Mooneye						500	
Paddlefish or spoonbill cat		927	27,405	1,249	157	340	300
Pike (grass)		20					
Pike, sauger			2,280				
Sturgeon:							
Lake	1,900	454					
Shovelnose			600				
Suckers	4,640	700					
Sunfish	50	13,879	11,590	13,563	14,161	550	
White bass						520	
Turtles				385			
Total	661,135	1,800,986	701,181	566,084	537,794	350,750	241,710

[1] Lines are omitted in 1914, 1917, 1922, and 1927 because data on the number were not available.

MISSISSIPPI RIVER BETWEEN LAKES PEPIN AND KEOKUK

Statistics of the fisheries of the Mississippi River between Lakes Pepin and Keokuk were obtained for the year 1930 for the second time since they were collected as a part of the complete survey of the Mississippi River and tributaries for 1922. These two surveys have been made, as were those for Lakes Pepin and Keokuk, primarily to determine the biological and economic effects on the fisheries of this section following the construction of the Keokuk Dam; also, to forecast the probable effects of any subsequently constructed dams in this region.

The fisheries of the Mississippi River between Lakes Pepin and Keokuk, exclusive of those for mussel shells, employed 607 fishermen during 1930 as compared with 675 in 1929. The catch amounted to 3,539,760 pounds, valued at $252,184, which is an increase of 13 per cent in the catch and 10 per cent in the value of the catch as compared with the catch and its value for 1929.

Considered according to the value of the catch, German carp was the most important fish taken, accounting for 46 per cent of the total catch and 35 per cent of the value of the catch. Buffalofish ranked next, accounting for 24 per cent of the catch and 27 per cent of the value of the catch, and catfish and bullheads third, accounting for 11 per cent of the catch and 24 per cent of the value. Other species of importance were fresh-water drum or sheepshead, suckers, and bowfin.

OPERATING UNITS BY GEAR

The catch of fishery products in the Mississippi River between Lakes Pepin and Keokuk was taken by 308 regular fishermen, 299 casual fishermen, 271 motor boats, 479 other small boats, 219 haul seines having a combined length of 38,451 yards, 15 gill nets having a combined length of 2,616 yards, 151 lines with 44,000 hooks, 8 trammel nets having a combined length of 1,600 yards, 3,515 fyke nets, 301 pound nets, and 609 baskets.

CATCH BY GEAR

Two types of gear accounted for 92 per cent of the catch of fishery products taken in this region during 1930. First in importance were haul seines, which accounted for 66 per cent of the catch and 59 per cent of the value of the catch. Fyke nets ranked next, accounting for 26 per cent of the catch and 30 per cent of the value of the catch.

OPERATING UNITS BY STATES

Iowa ranked foremost in the number of persons fishing in that part of the Mississippi River between Lakes Pepin and Keokuk, accounting for 40 per cent of the total; Wisconsin ranked second with 32 per cent; Minnesota, third, with 20 per cent; and Illinois fourth, with 8 per cent. Iowa also ranked first in the number of fishing boats, accounting for 43 per cent of the total. Wisconsin followed with 30 per cent.

CATCH BY STATES AND COUNTIES

The fisheries of the Mississippi River between Lakes Pepin and Keokuk were prosecuted in 6 counties in Illinois, 8 in Iowa, 3 in Minnesota, and 6 in Wisconsin. The fisheries of Iowa accounted for

48 per cent of the total catch and 50 per cent of the total value of the catch, and those in Wisconsin accounted for 27 per cent of the catch and 25 per cent of the value. Allamakee County, Iowa, was the most important county, accounting for 21 per cent of the catch and 21 per cent of the value of the catch.

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1930

OPERATING UNITS AND CATCH: BY GEAR

Items	Haul seines		Gill nets		Lines		Trammel nets	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
Regular	212		5		31		4	
Casual	171		5		79		------	
Total	383		10		110		4	
Boats:								
Motor	167		5		23		4	
Other	276		7		97		4	
Apparatus:								
Number	219		15		151		8	
Length, yards	38,451		2,616		------		1,600	
Hooks	------		------		44,000		------	
SPECIES	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	123,250	5,133	------	------	200	2	------	------
Buffalofish	493,100	41,736	600	42	8,800	584	5,000	500
Burbot	------	------	------	------	150	15	------	------
Carp:								
German	1,133,000	61,192	5,200	262	32,450	1,419	16,000	800
American or quillback	43,600	1,291	50	1	250	5	------	------
Catfish and bullheads	183,225	20,157	700	175	48,750	7,810	------	------
Drum, fresh-water, or sheepshead	202,200	12,825	500	50	28,200	1,883	8,000	400
Mooneye	3,750	75	------	------	------	------	------	------
Pickerel	7,200	699	------	------	------	------	------	------
Sturgeon	420	70	------	------	800	144	------	------
Suckers	147,500	4,939	500	25	100	2	------	------
Total	2,337,245	148,117	7,550	555	119,700	11,864	29,000	1,700

Items	Fyke nets		Pound nets		Baskets		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
Regular	185		21		20		308	
Casual	68		5		------		299	
Total	253		26		20		607	
Boats:								
Motor	151		17		20		271	
Other	183		19		10		479	
Apparatus:								
Number	3,515		301		609		------	
SPECIES	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	2,100	85	------	------	------	------	125,550	5,220
Buffalofish	311,820	23,260	16,000	1,600	5,400	540	840,720	68,262
Burbot	------	------	------	------	------	------	150	15
Carp:								
German	389,340	22,758	22,500	1,545	14,000	700	1,612,490	88,676
American or quillback	------	------	------	------	------	------	43,900	1,297
Catfish, and bullheads	125,090	23,970	8,300	1,625	35,500	7,100	401,565	60,837
Drum, fresh-water, or sheepshead	81,340	5,033	10,500	525	4,500	315	335,240	21,031
Mooneye	------	------	------	------	------	------	3,750	75
Pickerel	1,000	100	------	------	------	------	8,200	799
Sturgeon	------	------	------	------	------	------	1,220	214
Suckers	9,375	377	9,500	415	------	------	166,975	5,758
Total	920,065	75,583	66,800	5,710	59,400	8,655	3,539,760	252,184

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1930—Continued

OPERATING UNITS: BY STATES AND COUNTIES

Items	Illinois							Iowa	
	Carroll County	Henderson County	Jo Daviess County	Mercer County	Rock Island County	Whiteside County	Total	Allamakee County	Clayton County
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	3	10	4	20	2	2	41	58	49
Casual	3	--------	5	--------	3	--------	11	26	17
Total	6	10	9	20	5	2	52	84	66
Boats:									
Motor	3	10	4	20	2	2	41	43	25
Other	5	10	6	20	5	2	48	58	34
Apparatus:									
Haul seines	1	--------	--------	3	--------	1	5	53	19
Length, yards	150	--------	--------	400	--------	150	700	8,900	3,237
Trammel nets	--------	8	--------	--------	--------	--------	8	--------	--------
Length, yards	--------	1,600	--------	--------	--------	--------	1,600	--------	--------
Fyke nets	24	--------	90	545	80	--------	739	308	1,021
Pound nets	--------	--------	--------	--------	--------	--------	--------	301	--------
Lines	6	--------	2	14	3	--------	25	--------	--------
Hooks	3,600	--------	200	8,400	1,800	--------	14,000	--------	--------
Baskets	24	210	--------	300	20	55	609	--------	--------

Items	Iowa							Minnesota	
	Clinton County	Dubuque County	Jackson County	Louisa County	Muscatine County	Scott County	Total	Houston County	Wabasha County
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	5	15	13	4	6	--------	150	4	2
Casual	10	14	4	2	6	13	92	2	3
Total	15	29	17	6	12	13	242	6	5
Boats:									
Motor	7	11	15	4	7	8	120	3	1
Other	13	51	16	6	12	10	200	4	4
Apparatus:									
Haul seines	6	9	4	2	2	--------	95	3	1
Length, yards	1,882	2,167	1,116	332	266	--------	17,900	700	166
Fyke nets	129	95	277	91	89	91	2,101	20	--------
Pound nets	--------	--------	--------	--------	--------	--------	301	--------	--------
Lines	24	7	4	--------	--------	8	43	--------	3
Hooks	4,800	1,400	400	--------	--------	800	7,400	--------	900

Items	Minnesota		Wisconsin							Total for region
	Winona County	Total	Buffalo County	Crawford County	Grant County	La Crosse County	Trempealeau County	Vernon County	Total	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	22	28	10	30	15	14	1	19	89	308
Casual	87	92	12	28	14	18	5	27	104	299
Total	109	120	22	58	29	32	6	46	193	607
Boats:										
Motor	20	24	7	27	15	20	2	15	86	271
Other	84	92	19	51	15	25	3	26	139	479
Apparatus:										
Haul seines	24	28	8	34	20	13	1	15	91	219
Length, yards	4,754	5,620	1,366	5,666	1,733	2,666	300	2,500	14,231	38,451
Gill nets	2	2	--------	6	--------	7	--------	--------	13	15
Length, yards	850	850	--------	600	--------	1,166	--------	--------	1,766	2,616
Trammel nets	--------	--------	--------	--------	--------	--------	--------	--------	--------	8
Length, yards	--------	--------	--------	--------	--------	--------	--------	--------	--------	1,600
Fyke nets	49	69	--------	323	158	70	--------	55	606	3,515
Pound nets	--------	--------	--------	--------	--------	--------	--------	--------	--------	301
Lines	53	56	1	13	--------	--------	4	9	27	151
Hooks	15,800	16,700	200	2,600	--------	--------	1,100	2,000	5,900	44,000
Baskets	--------	--------	--------	--------	--------	--------	--------	--------	--------	609

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1930—Continued

CATCH: BY STATES AND COUNTIES

Species	Illinois							
	Carroll County		Henderson County		Jo Daviess County		Mercer County	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	----	----	----	----	1,000	$30	----	----
Buffalofish	11,300	$678	10,400	$1,040	20,000	2,000	86,400	$5,188
Carp: German	29,250	1,170	30,000	1,500	3,000	150	173,100	7,225
Catfish and bullheads	5,200	1,040	12,000	2,400	8,000	1,600	48,400	9,588
Drum, fresh-water, or sheepshead	6,300	441	12,500	715	5,000	250	54,600	3,779
Suckers	----	----	----	----	2,000	60	----	----
Total	52,050	3,329	64,900	5,655	39,000	4,090	362,500	25,780

Species	Illinois					
	Rock Island County		Whiteside County		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	----	----	----	----	1,000	$30
Buffalofish	6,000	$360	5,000	$500	139,100	9,766
Carp: German	34,500	1,380	8,000	320	277,850	11,745
Catfish and bullheads	1,100	220	4,000	800	78,700	15,648
Drum, fresh-water, or sheepshead	----	----	1,000	80	79,400	5,265
Sturgeon	200	24	----	----	200	24
Suckers	----	----	----	----	2,000	60
Total	41,800	1,984	18,000	1,700	578,250	42,538

Species	Iowa									
	Allamakee County		Clayton County		Clinton County		Dubuque County		Jackson County	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	44,000	$1,540	2,200	$131	----	----	1,700	$85	500	$8
Buffalofish	127,000	12,580	91,000	9,090	50,400	$3,024	35,200	3,520	87,520	4,744
Carp: German	364,500	23,205	156,300	11,441	117,700	3,966	101,600	6,080	58,540	2,342
Catfish and bullheads	111,800	10,320	32,900	6,392	25,100	5,024	25,300	4,664	8,475	1,677
Drum, fresh-water, or sheepshead	60,500	3,025	27,090	1,895	400	28	8,900	425	1,600	117
Pickerel	3,500	350	4,000	400	----	----	----	----	700	49
Sturgeon	----	----	200	30	----	----	----	----	----	----
Suckers	42,000	1,790	4,800	261	----	----	3,400	140	----	----
Total	753,300	52,810	318,490	29,620	193,600	12,042	176,100	14,914	157,335	8,937

Species	Iowa							
	Louisa County		Muscatine County		Scott County		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	----	----	----	----	----	----	48,400	$1,764
Buffalofish	3,950	$297	7,800	$458	6,850	$411	409,720	34,114
Carp: German	11,050	462	19,000	766	11,850	451	840,540	48,713
Catfish and bullheads	3,250	650	4,700	920	6,200	1,240	217,725	30,887
Drum, fresh-water, or sheepshead	11,100	777	3,200	224	200	14	112,990	6,505
Pickerel	----	----	----	----	----	----	8,200	799
Sturgeon	----	----	----	----	----	----	200	30
Suckers	----	----	----	----	----	----	50,200	2,191
Total	29,350	2,186	34,700	2,378	25,100	2,116	1,687,975	125,003

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1930—Continued

CATCH: By States and counties—Continued

Species	Minnesota							
	Houston County		Wabasha County		Winona County		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	--------	--------	200	$2	3, 200	$64	3, 400	$66
Buffalofish	10, 000	$1, 000	1, 200	100	44, 400	3, 552	55, 600	4, 652
Burbot	--------	--------	150	15	--------	--------	150	15
Carp:								
German	20, 000	1, 600	8, 600	356	62, 150	3, 096	90, 750	5, 052
American or quillback	--------	--------	1, 250	25	27, 350	811	28, 600	836
Catfish and bullheads	2, 700	540	1, 200	144	40, 700	4, 888	44, 600	5, 572
Drum, fresh-water, or sheepshead	4, 650	372	2, 600	198	57, 550	4, 444	64, 800	5, 014
Mooneye	--------	--------	--------	--------	3, 750	75	3, 750	75
Suckers	1, 800	54	100	2	25, 750	748	27, 650	804
Total	39, 150	3, 566	15, 300	842	264, 850	17, 678	319, 300	22, 086

Species	Wisconsin							
	Buffalo County		Crawford County		Grant County		La Crosse County	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	300	$6	45, 800	$2, 514	1, 400	$85	--------	--------
Buffalofish	1, 900	154	95, 700	7, 370	75, 000	7, 500	19, 000	$1, 440
Carp:								
German	34, 500	1, 725	171, 450	10, 280	63, 000	5, 340	41, 500	2, 075
American or quillback	15, 100	455	--------	--------	--------	--------	--------	--------
Catfish and bullheads	500	100	27, 040	5, 225	3, 400	690	21, 250	1, 740
Drum, fresh-water, or sheepshead	400	30	40, 550	2, 269	7, 300	464	1, 700	51
Sturgeon	150	30	--------	--------	--------	--------	--------	--------
Suckers	33, 000	990	19, 525	928	1, 900	104	11, 000	330
Total	85, 850	3, 490	400, 065	28, 586	152, 000	14, 183	94, 450	5, 636

Species	Wisconsin						Total for region	
	Trempealeau County		Vernon County		Total			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	250	$5	25, 000	$750	72, 750	$3, 360	125, 550	$5, 220
Buffalofish	1, 000	80	43, 700	3, 186	236, 300	19, 730	840, 720	68, 262
Burbot	--------	--------	--------	--------	--------	--------	150	15
Carp:								
German	3, 000	150	89, 900	3, 596	403, 350	23, 166	1, 612, 490	88, 676
American or quillback	200	6	--------	--------	15, 300	461	43, 900	1, 297
Catfish and bullheads	1, 400	280	6, 950	695	60, 540	8, 730	401, 565	60, 837
Drum, fresh-water, or sheepshead	800	68	27, 300	1, 365	78, 050	4, 247	335, 240	21, 031
Mooneye	--------	--------	--------	--------	--------	--------	3, 750	75
Pickerel	--------	--------	--------	--------	--------	--------	8, 200	799
Sturgeon	600	120	70	10	820	160	1, 220	214
Suckers	700	21	21, 000	330	87, 125	2, 703	166, 975	5, 758
Total	7, 950	730	213, 920	9, 932	954, 235	62, 557	3, 539, 760	252, 184

FISHERIES OF ALASKA

Statistics for the fisheries of Alaska are collected and compiled by the Alaska division of the bureau. A summary of these statistics appears herewith. For the detailed figures the reader is referred to Alaska Fishery and Fur-Seal Industries in 1930, by Ward T. Bower, Appendix I to the report of the United States Commissioner of Fisheries for 1931.

The fisheries of Alaska during 1930 employed 27,568 persons, of whom 10,189 were fishermen, 15,453 were engaged in the wholesale and manufacturing industries, and 1,926 in transporting fishery products. The catch in round weight, exclusive of whales, amounted to 611,285,108 pounds, valued at $12,285,313. The round weight of whales could not be determined, but their products amounted to 9,416,475 pounds, valued at $470,265. Of the total catch, exclusive of whales, 426,441,857 pounds, valued at $8,040,786, consisted of salmon; 182,863,624 pounds, valued at $4,136,351, consisted of other fish; and 1,979,627 pounds, valued at $108,176, consisted of shellfish.

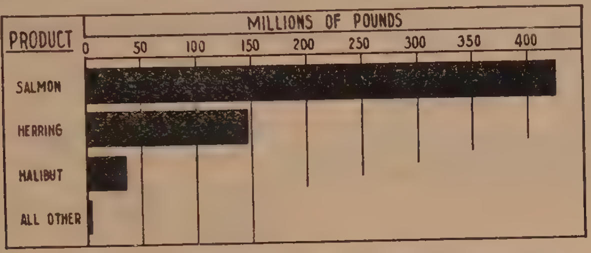

FIGURE 23.—Yield of principal fishery products in Alaska, 1930

There were 260 establishments (exclusive of duplication) engaged in the fisheries trade in Alaska in 1930. Of these, 153 canned fish, 95 cured fish, 24 manufactured by-products, and 46 handled fresh and frozen fishery products.

The output of these establishments amounted to 370,564,027 pounds, valued at $37,679,049. The salmon industry was by far the most important and produced 259,143,338 pounds of products, valued at $31,532,488. In value, the halibut industry was next in importance and produced 31,557,084 pounds of products, valued at $2,991,400. The herring industry ranked third and produced 68,144,048 pounds of products, valued at $2,133,677. Of the remainder, whale, clam, and shrimp products were most important in value.

In considering the wholesale and manufacturing industries separately, the canning industry ranked foremost and produced 242,041,911 pounds of fishery products, valued at $29,943,681. In value, fresh fish ranked second, producing 27,296,445 pounds of products, valued at $2,669,796. The by-products industry was third, with products amounting to 62,121,168 pounds, valued at $2,063,527; the cured-fish industry was fourth, with an output of 16,023,188 pounds, valued at $1,604,153; and the frozen-fish industry fifth, accounting for the remainder of the products, amounting to 23,081,315 pounds, valued at $1,397,892.

Fisheries of Alaska, 1930

SUMMARY: BY DISTRICTS

Items	Southeast Alaska		Central Alaska	
PERSONS ENGAGED	*Number*		*Number*	
In fishing	4, 985		2, 585	
In transporting	956		669	
In wholesale and manufacturing industries	6, 873		4, 400	
Total	12, 814		7, 654	
CRAFT EMPLOYED				
Vessels fishing	606		58	
Boats fishing	2, 433		1, 644	
Vessels transporting	239		168	
Scows, houseboats, pile drivers, etc	407		369	
Total	3, 685		2, 239	
CATCH	*Pounds*	*Value*	*Pounds*	*Value*
Fish:				
Salmon	244, 304, 671	$4, 279, 946	132, 329, 964	$2, 476, 552
Other	147, 587, 911	3, 742, 921	28, 064, 527	299, 421
Shellfish	1, 070, 733	55, 099	908, 894	53, 077
Total	392, 963, 315	8, 077, 966	161, 303, 385	2, 829, 050
	Number		*Number*	
Whales	----------		228	
WHOLESALE AND MANUFACTURING				
Establishments	112		97	
PRODUCTS AS PREPARED FOR MARKET	*Pounds*	*Value*	*Pounds*	*Value*
Salmon	157, 920, 849	$16, 784, 100	78, 499, 923	$9, 711, 966
Herring	52, 027, 646	1, 480, 880	11, 715, 677	415, 040
Halibut	29, 370, 454	2, 851, 213	1, 585. 469	95, 194
Cod	----------	----------	299, 237	15, 624
Trout	65. 246	8, 647	33. 000	3, 437
Sablefish	449, 463	20, 514	----------	----------
Smelt	----------	----------	37, 720	5, 281
Flounders	318, 936	7, 954	----------	----------
Rockfish	5. 876	122	----------	----------
"Lingcod"	22, 826	685	----------	----------
Clams	12, 570	3, 609	414, 021	238, 281
Shrimp	513, 826	210, 503	----------	----------
Crabs	60, 185	24, 554	47. 176	10, 843
Whale	----------	----------	4, 435. 375	225, 145
Total	240, 767, 877	21, 392, 781	97, 067, 598	10, 720, 811

Items	Western Alaska	Total
PERSONS ENGAGED	*Number*	*Number*
In fishing	2, 619	10, 189
In transporting	301	1, 926
In wholesale and manufacturing industries	4, 180	15, 453
Total	7, 100	27, 568
CRAFT EMPLOYED		
Vessels fishing	26	690
Boats fishing	1, 176	5, 253
Vessels transporting	80	487
Scows, houseboats, pile drivers, etc	189	965
Total	1, 471	7, 395

Fisheries of Alaska, 1930—Continued

SUMMARY: BY DISTRICTS—Continued

Items	Western Alaska		Total	
CATCH	*Pounds*	*Value*	*Pounds*	*Value*
Fish:				
Salmon	49, 807, 222	$1, 284, 288	426, 441, 857	$8, 040, 786
Other	7, 211, 186	94, 009	182, 863, 624	4, 136, 351
Shellfish			1, 979, 627	108, 176
Total	57, 018, 408	1, 378, 297	611, 285, 108	12, 285, 313
	Number		*Number*	
Whales	127		355	
WHOLESALE AND MANUFACTURING	*Number*		*Number*	
Establishments	51		260	
PRODUCTS AS PREPARED FOR MARKET	*Pounds*	*Value*	*Pounds*	*Value*
Salmon	22, 722, 566	$5, 036, 422	259, 143, 338	$31, 532, 488
Herring	4, 400, 725	237, 757	68, 144, 048	2, 133, 677
Halibut	601, 161	44, 993	31, 557, 084	2, 991, 400
Cod	23, 000	1, 165	322, 237	16, 789
Trout			98, 246	12, 084
Sablefish			449, 463	20, 514
Smelt			37, 720	5, 281
Flounders			318, 936	7, 954
Rockfish			5, 876	122
"Lingcod"			22, 826	685
Clams			426, 591	241, 890
Shrimp			513, 826	210, 503
Crabs			107, 361	35, 397
Whale	4, 981, 100	245, 120	9, 416, 475	470, 265
Total	32, 728, 552	5, 565, 457	370, 564, 027	37, 679, 049

OPERATING UNITS: BY DISTRICTS

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Fishermen	4, 985	2, 585	2, 619	10, 189
Vessels fishing:				
Steam	1	3	4	8
Net tonnage	70	207	340	617
Motor	605	55	22	682
Net tonnage	10, 199	831	578	11, 608
Boats fishing:				
Motor	1, 088	637	89	1, 814
Other	1, 345	1, 007	1, 087	3, 439
Apparatus:				
Traps	444	255	2	701
Purse seines	489	192	22	703
Yards	170, 772	39, 190	8, 870	218, 832
Haul seines	5	177	7	189
Yards	1, 000	43, 586	930	45, 516
Gill nets	361	2, 558	2, 371	5, 290
Yards	42, 730	240, 230	286, 244	569, 204
Beam trawls	9			9
Wheels			266	266
Apparatus—Con.				
Lines—				
Hand lines (cod fishery)		65	2	67
Trawl lines (cod fishery)		28	6	34
Troll lines (salmon fishery)	3, 386	6		3, 392
Skates of lines (halibut fishery)	5, 784			5, 784
Crab pots	300	320		620
Herring pounds	4	2	1	7
Herring pound seines	13	12	2	27

Fisheries of Alaska, 1930—Continued

CATCH: BY DISTRICTS

[Estimated round weight and value to fishermen]

Items	Southeast Alaska		Central Alaska	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Salmon:				
Coho, or silver	15,988,056	$423,230	13,798,696	$354,388
Chum, or keta	24,376,536	269,218	25,327,638	261,161
Pink, or humpback	173,932,928	2,507,944	66,346,412	876,805
King, or spring	11,895,078	340,516	2,391,700	113,309
Red, or sockeye	18,112,073	739,038	24,465,518	870,889
Herring	113,838,087	853,786	25,353,911	190,154
Halibut	32,633,838	2,851,213	1,761,632	95,194
Cod			850,610	5,355
Trout:				
Dolly Varden	52,731	5,656	39,271	3,297
Steelhead	30,972	2,991	2,523	140
Sablefish	660,975	20,514		
Smelt			56,580	5,281
Flounders	327,151	7,954		
Rockfishes	9,040	122		
"Lingcod"	35,117	685		
Total	391,892,582	8,022,867	160,394,491	2,775,973
SHELLFISH				
Crabs	113,730	12,277	81,092	5,421
Shrimp	931,881	42,100		
Clams, razor	25,122	722	827,802	47,656
Total	1,070,733	55,099	908,894	53,077
Grand total	392,963,315	8,077,966	161,303,385	2,829,050

Items	Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Salmon:				
Coho, or silver	1,560,792	$15,502	31,347,544	$793,120
Chum, or keta	9,882,882	50,656	59,587,056	581,035
Pink, or humpback	1,336,664	19,170	241,616,004	3,403,919
King, or spring	3,265,800	67,440	17,552,578	521,265
Red, or sockeye	33,761,084	1,131,520	76,338,675	2,741,447
Herring	6,479,897	48,599	145,671,895	1,092,539
Halibut	667,956	44,993	35,063,426	2,991,400
Cod	63,333	417	913,943	5,772
Trout:				
Dolly Varden			92,002	8,953
Steelhead			33,495	3,131
Sablefish			660,975	20,514
Smelt			56,580	5,281
Flounders			327,151	7,954
Rockfishes			9,040	122
"Lingcod"			35,117	685
Total	57,018,408	1,378,297	609,305,481	12,177,137
SHELLFISH				
Crabs			194,822	17,698
Shrimp			931,881	42,100
Clams, razor			852,924	48,378
Total			1,979,627	108,176
Grand total	57,018,408	1,378,297	611,285,108	12,285,313

NOTE.—In addition to the above statistics, 355 whales were taken in Alaskan waters. The round weight and value to fishermen can not be determined, but the products amounted to 9,416,475 pounds, valued at $470,265.

Industries related to the fisheries of Alaska, 1930

TRANSPORTING

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Persons engaged	956	669	301	1,926
Vessels transporting:				
Steam	1	3	16	20
Net tonnage	150	3,780	29,018	32,948
Motor	238	164	64	466
Net tonnage	6,492	4,431	3,374	14,297
Vessels—Continued.				
Sail	-------	1	-------	1
Net tonnage	-------	1,590	-------	1,590
Scows, houseboats, pile drivers, etc.	407	369	189	965

WHOLESALE AND MANUFACTURING

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
Persons engaged	*Number* 6,873	*Number* 4,400	*Number* 4,180	*Number* 15,453
Establishments:				
Handling fresh and frozen fish	40	6	-------	46
Curing fish	41	29	25	95
Canning fish	59	68	26	153
Manufacturing by-products	15	8	1	24
Total (exclusive of duplication)	112	97	51	260

PRODUCTS AS PREPARED FOR MARKET

Items	Southeast Alaska		Central Alaska	
	Pounds	*Value*	*Pounds*	*Value*
FRESH				
Salmon (all species)	1,295,216	$117,620	-------	-------
Herring (for bait)	2,966,255	36,609	273,300	$4,422
Halibut	21,662,879	2,243,131	9,300	655
Trout	49,013	6,581	13,050	1,461
Sablefish	16,073	574	-------	-------
Smelt	-------	-------	37,720	5,281
Flounders (for mink feed)	245,000	6,125	-------	-------
"Lingcod"	423	13	-------	-------
Crabs:				
Meat	53,545	23,890	33,916	10,183
Whole in shell	6,640	664	13,260	660
Clams: Whole in shell	-------	-------	240	50
Shrimp:				
Meat	510,956	210,072	-------	-------
Whole in shell	2,870	431	-------	-------
Total	26,808,870	2,645,710	380,786	22,712
FROZEN				
Salmon (all species)	6,590,806	560,520	10,800	648
Herring (for bait)	5,957,960	60,807	-------	-------
Halibut	7,707,575	608,082	1,573,050	94,383
Halibut cheeks	-------	-------	3,119	156
Trout	8,793	618	18,060	1,806
Sablefish	422,590	19,400	-------	-------
Flounders	73,936	1,829	-------	-------
Rockfishes	5,876	122	-------	-------
"Lingcod"	22,403	672	-------	-------
Total	20,789,939	1,252,050	1,605,029	96,993
CURED				
Salmon:				
Mild cured	4,323,925	850,380	123,600	18,342
Pickled	151,600	15,257	544,100	64,392
Dried, smoked, and dry salted	19,200	2,400	3,600	565

Industries related to the fisheries of Alaska, 1930—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

Items	Southeast Alaska		Central Alaska	
	Pounds	*Value*	*Pounds*	*Value*
CURED—continued				
Herring:				
Pickled (for food)—				
Scotch cure	1, 382, 895	$87, 221	3, 011, 375	$166, 195
Norwegian cure	90, 250	5, 363	11, 500	920
Special cure for repacking	33, 600	2, 520		
Roused	12, 500	500		
Spiced	2, 000	300		
Cod:				
Dry salted			173, 502	8, 269
Stockfish			15, 600	2, 090
Pickled			110, 135	5, 265
Trout, pickled			450	50
Sablefish, pickled	10, 800	540		
Total	6, 026, 770	964, 481	3, 993, 862	266, 088
CANNED				
Salmon:				
Coho, or silver	7, 471, 296	1, 371, 203	8, 320, 896	1, 342, 842
Chum, or keta	13, 606, 944	1, 025, 981	13, 668, 048	1, 023, 143
Pink, or humpback	110, 878, 848	9, 778, 641	41, 268, 528	3, 435, 283
King, or spring	333, 072	108, 138	1, 538, 880	430, 799
Red, or sockeye	10, 619, 568	2, 890, 171	12, 893, 808	3, 392, 167
Trout	5, 856	854	1, 440	120
Miscellaneous fish	55, 848	5, 809	768	160
Clams	12, 570	3, 609	413, 781	238, 231
Total	142, 984, 002	15, 184, 406	78, 106, 149	9, 862, 745
BY-PRODUCTS				
Fertilizer:				
Salmon	2, 187, 100	49, 254	96, 782	2, 420
Whale			1, 084, 000	23, 960
Meal, herring	19, 502, 823	557, 576	3, 908, 200	97, 474
Oil:				
Salmon	389, 010	9, 320	30, 113	1, 205
Herring	22, 079, 363	729, 984	4, 511, 302	146, 029
Whale			3, 256, 500	196, 441
Sperm			94, 875	4, 744
Total	44, 158, 296	1, 346, 134	12, 981, 772	472, 273
Grand total	240, 767, 877	21, 392, 781	97, 067, 598	10, 720, 811

Items	Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*
FRESH				
Salmon (all species)			1, 295, 216	$117, 620
Herring (for bait)	100, 625	$1, 006	3, 340, 180	42, 037
Halibut	6, 164	368	21, 678, 343	2, 244, 154
Trout			62, 063	8, 042
Sablefish			16, 073	574
Smelt			37, 720	5, 281
Flounders (for mink feed)			245, 000	6, 125
"Lingcod"			423	13
Crabs:				
Meat			87, 461	34, 073
Whole in shell			19, 900	1, 324
Clams: Whole in shell			240	50
Shrimp:				
Meat			510, 956	210, 072
Whole in shell			2, 870	431
Total	106, 789	1, 374	27, 296, 445	2, 669, 796
FROZEN				
Salmon (all species)	12, 600	680	6, 614, 206	561, 848
Herring (for bait)			5, 957, 960	60, 807
Herring (for food)	78, 750	3, 544	78, 750	3, 544
Halibut	594, 997	44, 625	9, 875, 622	747, 090
Halibut cheeks			3, 119	156
Trout			26, 853	2, 424
Sablefish			422, 590	19, 400
Flounders			73, 936	1, 829
Rockfishes			5, 876	122
"Lingcod"			22, 403	672
Total	686, 347	48, 849	23, 081, 315	1, 397, 892

Industries related to the fisheries of Alaska, 1930—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

Items	Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*
CURED				
Salmon:				
Mild cured			4, 447, 525	$868, 722
Pickled	167, 250	$23, 992	862, 950	103, 641
Dried, smoked and dry salted	1, 590, 956	115, 220	1, 613, 756	118, 185
Herring:				
Pickled (for food)—				
Scotch cure	3, 686, 975	209, 394	8, 081, 245	462, 810
Norwegian cure	43, 625	2, 873	145, 375	9, 156
Special cure for repacking			33, 600	2, 520
Roused	340, 000	14, 545	352, 500	15, 045
Spiced			2, 000	300
Dry salted	150, 750	6, 395	150, 750	6, 395
Cod:				
Dry salted	13, 000	765	186, 502	9, 034
Stockfish			15, 600	2, 090
Pickled	10, 000	400	120, 135	5, 665
Trout, pickled			450	50
Sablefish, pickled			10, 800	540
Total	6, 002, 556	373, 584	16, 023, 188	1, 604, 153
CANNED				
Salmon:				
Coho, or silver	164, 064	30, 979	15, 956, 256	2, 745, 024
Chum, or keta	1, 521, 840	113, 000	28, 796, 832	2, 162, 124
Pink, or humpback	902, 256	74, 497	153, 049, 632	13, 288, 421
King, or spring	1, 004, 304	259, 351	2, 876, 256	798, 288
Red, or sockeye	17, 359, 296	4, 418, 703	40, 872, 672	10, 701, 041
Trout			7, 296	974
Miscellaneous fish			56, 616	5, 969
Clams			426, 351	241, 840
Total	20, 951, 760	4, 896, 530	242, 041, 911	29, 943, 681
BY-PRODUCTS				
Fertilizer:				
Salmon			2, 283, 882	51, 674
Whale	1, 256, 000	27, 440	2, 340, 000	51, 400
Meal, herring			23, 411, 023	655, 050
Whalebone	5, 600	308	5, 600	308
Pickled whale meat	37, 000	1, 850	37, 000	1, 850
Oil:				
Salmon			419, 123	10, 525
Herring			26, 590, 665	876, 013
Whale	2, 868, 750	174, 835	6, 125, 250	371, 276
Sperm	813, 750	40, 687	908, 625	45, 431
Total	4, 981, 100	245, 120	62, 121, 168	2, 063, 527
Grand total	32, 728, 552	5, 565, 457	370, 564, 027	37, 679, 049

NOTE.—Halibut products include all taken by the Alaska fleet, some of which were landed at other than-Alaska ports. The total landings in Alaska in 1930 amounted to 11,408,984 pounds, valued at $863,089 (including 27,000 pounds, valued at $2,000, landed by Canadian vessels), as compared with 13,841,874 pounds, valued at $1,424,623, in 1929.

SUPPLEMENTARY TABLE SHOWING THE PACK OF CANNED PRODUCTS IN "STANDARD CASES"[1]

Items	Southeast Alaska		Central Alaska	
	Cases	*Value*	*Cases*	*Value*
Salmon:				
Coho, or silver	155, 652	$1, 371, 203	173, 352	$1, 342, 842
Chum, or keta	283, 478	1, 025, 981	284, 751	1, 023, 143
Pink, or humpback	2, 309, 976	9, 778, 641	859, 761	3, 435, 283
King, or spring	6, 939	108, 138	32, 060	430, 799
Red, or sockeye	221, 241	2, 890, 171	268, 621	3, 392, 167
Trout	122	854	30	120
Miscellaneous fish	1, 163	5, 809	16	160
Clams	838	3, 609	27, 585	238, 231
Total	2, 979, 409	15, 184, 406	1, 646, 176	9, 862, 745

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[1] The pack of salmon, trout, and miscellaneous products has been converted to "standard cases" of forty-eight 1-pound cans, and clams to "standard cases" of 48 No. 1 5-ounce cans.

Industries related to the fisheries of Alaska, 1930—Continued

SUPPLEMENTARY TABLE SHOWING THE PACK OF CANNED PRODUCTS IN "STANDARD CASES"—Continued

Items	Western Alaska		Total	
	Cases	*Value*	*Cases*	*Value*
Salmon:				
Coho, or silver	3,418	$30,979	332,422	$2,745,024
Chum, or keta	31,705	113,000	599,934	2,162,124
Pink, or humpback	18,797	74,497	3,188,534	13,288,421
King, or spring	20,923	259,351	59,922	798,288
Red, or sockeye	361,652	4,418,703	851,514	10,701,041
Trout	--------	--------	152	974
Miscellaneous fish	--------	--------	1,179	5,969
Clams	--------	--------	28,423	241,840
Total	436,495	4,896,530	5,062,080	29,943,681

SUPPLEMENTARY TABLE SHOWING THE OUTPUT OF BY-PRODUCTS IN TONS AND GALLONS

Items		Southeast Alaska		Central Alaska	
		Quantity	*Value*	*Quantity*	*Value*
Fertilizer:					
Salmon	tons	1,094	$49,254	48	$2,420
Whale	do	--------	--------	542	23,960
Meal, herring	do	9,751	557,576	1,954	97,474
Oil:					
Salmon	gallons	51,868	9,320	4,015	1,205
Herring	do	2,943,915	729,984	601,507	146,029
Whale	do	--------	--------	434,200	196,441
Sperm	do	--------	--------	12,650	4,744
Total		--------	1,346,134	--------	472,273

Items		Western Alaska		Total	
		Quantity	*Value*	*Quantity*	*Value*
Fertilizer:					
Salmon	tons	--------	--------	1,142	$51,674
Whale	do	628	$27,440	1,170	51,400
Meal, herring	do	--------	--------	11,705	655,050
Whalebone	do	3	308	3	308
Pickled whale meat	do	19	1,850	19	1,850
Oil:					
Salmon	gallons	--------	--------	55,883	10,525
Herring	do	--------	--------	3,545,422	876,013
Whale	do	382,500	174,835	816,700	371,276
Sperm	do	108,500	40,687	121,150	45,431
Total		--------	245,120	--------	2,063,527

FISHERIES OF THE VIRGIN ISLANDS OF THE UNITED STATES

During 1930, the fisheries of the Virgin Islands of the United States employed 405 fishermen. Their catch amounted to 616,000 pounds of fishery products valued at $49,080 to the fishermen. In making the catch, the fishermen used 1 motor boat, 38 sail boats, and 147 row boats. The gear employed consisted of 40 haul seines, 90 tangle nets (turtle), 113 cast nets, 297 lines, and 1,600 set pots.

As the fishermen keep no records of their operations, it was impossible to separate the catch by species. In general, it may be stated that about one-third of the total catch was made by set pots, one-third by seines, and one-third by lines or other types of gear, and by hand.

Fisheries of the Virgin Islands, 1930

Items	St. Thomas Island	St. John Island	St. Croix Island	Total
	Number	*Number*	*Number*	*Number*
Fishermen	127	78	200	405
Boats:				
Motor			1	1
Sail	11	7	20	38
Row, (bateaux, canoes, etc.)	47	34	66	147
Apparatus:				
Haul seines	19	11	10	40
Yards	2, 524	1, 000	1, 393	4, 917
Tangle nets (turtle)	9	50	31	90
Square yards	3, 710	10, 000	2, 996	16, 706
Cast nets	44	22	47	113
Lines—				
Troll	14	31	23	68
Hooks	14	31	23	68
Hand	73	62	69	204
Hooks	104	62	69	235
Trawl	3		22	25
Hooks	450		303	753
Set pots	471	195	934	1, 600
Catch:				
Pounds	194, 000	133, 000	289, 000	616, 000
Value	$11, 640	$7, 650	$29, 790	$49, 080

COMMON AND SCIENTIFIC NAMES OF FISHERY PRODUCTS

In order to prevent misunderstanding from the use of common names employed in the tables and discussions, the following list of common and scientific names is given.

Common and scientific names of the commercial fishery products caught in the United States and Alaska

Common name as shown in bureau reports	Other common names	Scientific names
Albacore	Longfin tuna	*Germo alalunga.*
Alewives	Branch herring, wall-eyed or big-eyed herring. Blueback, glut herring	*Pomolobus pseudoharengus.* *Pomolobus æstivalis.*
Amberjack		Seriola sp.
Anchovies		*Engraulis mordax.* *Anchoviella delicatissima.* *Anchoviella compressa.*
Angelfish		*Pomacanthus arcuatus.* *Angelichthys isabelita.*
Barracuda		*Sphyræna argentea* (Pacific coast). *Sphyræna barracuda* (Atlantic coast).
Black bass	Smallmouth bass Largemouth bass	*Micropterus dolomieu.* *Micropterus salmoides.*
Bluefish	Tailor	*Pomatomus saltatrix.*
Blue pike	Pike perch, blue pickerel (Canada)	*Stizostedion glaucum.*
Blue runner or hardtail	Runner	*Caranx crysos.*
Bonito		*Sarda sarda.* *Sarda chiliensis.*
Bowfin		*Amia calva.*
Buffalofish		Ictiobus sp.
Bullhead		Ameiurus sp.
Butterfish	Dollarfish	*Poronotus triacanthus.*
Burbot	Lawyer, ling	*Lota maculosa.*
Cabio	Coal-fish, crab eater, cobia	*Rachycentron canadum.*
Carp (German)		*Cyprinus carpio.*
Catfish		Siluridæ sp.
Cero		*Scomberomorus regalis.*
Chubs	Tullibee in Canada; longjaws, bluefin, blackfin in United States.	All Leucichthys except *artedi* (in Great Lakes).
Cisco	Herring in Canada	*Leucichthys artedi* (Lake Erie only).
Cod	Codfish	*Gadus macrocephalus* (Pacific coast.) *Gadus callarias* (Atlantic coast).
Cowfish	Trunkfish, chapin	Ostracion sp.
Crappie	White crappie Black crappie, strawberry bass, calico bass.	*Pomoxis annularis.* *Pomoxis sparoides.*
Crevalle		*Caranx hippos.*
Croaker	Crocus, hardhead	*Micropogon undulatus.*
Cunner	Chogset, blue perch, bergall	*Tautogolabrus adspersus.*
Cusk		*Brosmius brosme.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in bureau reports	Other common names	Scientific names
Dolly Varden trout	Salmon trout, bull trout	*Salvelinus parkei.*
Dolphin		*Coryphaena hippurus.*
Drum, fresh-water, or sheepshead.	White perch, gaspergou	*Aplodinotus grunniens.*
Drum, black		*Pogonias cromis.*
Drum, red	Channel bass, redfish, spotted bass	*Sciænops ocellatus.*
Eels		*Anguilla rostrata.* *Leptocephalus conger.* *Gymnothorax mordax.* *Gymnothorax moringua.*
Eulachon	Candlefish	*Thaleichthys pacificus.*
Flounders	Dabs, blackbacks, lemon sole, winter flounder, summer flounder.	Pleuronectidae sp.
Flying fish		*Cysilurus californicus.*
Frigate mackerel		*Auxis thazard.*
Garfish		Tylosurus sp. Ablennes sp.
Gizzard shad	Nanny shad, mud shad	*Dorosoma cepedianum.*
Gold-eye		Hiodon sp.
Goldfish	Sand perch	*Carassius auratus.*
Goosefish		*Lophius piscatorius.*
Grayfish	Dogfish Spiny dog Smooth dog	*Squalus sucklii* (Pacific coast). *Squalus acanthias.* *Galeohinus lævis.*
Greenfish	Rudderfish	*Girella nigricans.*
Groupers		Epinephelus sp. Mycteroperca sp.
Grunts	Margatefish, sailors choice (Key West).	Hæmulon sp.
Haddock		*Melanogrammus aegilfinus.*
Hake	Squirrel hake, Boston hake, ling, black hake, mud hake. Merluccio	Urophycis sp. (Atlantic coast). *Merlucius productus* (Pacific coast).
Halfmoon		*Medialuna californiensis.*
Halibut		*Hippoglossus hippoglossus.*
Halibut, "California"		*Paralichthys californicus.*
Hardhead		*Orthodon microlepidotus.*
Harvestfish	Starfish, pappyfish	*Peprilus alepidotus.*
Herring		*Clupea harengus* (Atlantic coast). *Clupea pallasii* (Pacific coast).
Hickory shad	Tailor shad	*Pomolobus mediocris.*
Hog-choker		*Achirus fasciatus.*
Hogfish	Capitaine, perro perro	*Lachnolaimus maximus* (Florida).
Horse mackerel		*Trachurus symmetricus.*
Jewfish		*Promicrops itaiara.*
Kingfish		*Scomberomorus cavalla.*
Kingfish (California)	Little roncador, croaker	*Genyonemus lineatus.*
King whiting	Northern whiting, kingfish, seamink	Menticirrhus sp.
Ladyfish	Bonefish, banana fish	*Albula vulpes.*
Lake herring	Herring	*Leucichthys artedi* (Great Lakes, except Erie).
Lake trout		*Cristivomer namaycush.*
Launce	Sand eel, lant, sand launce	*Ammodytes americanus.*
"Lingcod"	Cultus cod, blue cod, buffalo cod, ling	*Ophiodon elongatus.*
Mackerel		*Scomber scombrus* (Atlantic coast). *Scomber diego* (Pacific coast).
Menhaden	Mossbunker, pogy	*Brevoortia tyrannus.*
Minnows		Cyprinidae sp.
Mojarro		Eucinostomus sp.
Moon-eye	Toothed herring	Hiodon sp.
Moonfish		*Vomer setipinnis.* *Selene vomer*
Mullet	Jumping mullet	Mugil sp.
Mummichog	Mayfish, killifish	Fundulus sp.
Muttonfish		*Lutianus analis.*
Paddlefish	Spoonbill cat	*Polyodon spathula.*
Parrotfish		Scaridæ sp.
Perch, white	White perch Blue perch, surf-fishes	*Morone americana.* Embiotocidæ sp. (Pacific coast).
Perch, yellow	Winged perch	*Perca flavescens.*
Permit	Great pompano	*Trachinotus goodei.*
Pickerel		*Esox reticulatus.* *Esox americanus.*
Pigfish		*Orthopristis chrysopterus.*
Pike (jacks)	Great Lakes pike, pickerel	*Esox lucius.*
Pilchard	Sardine	*Sardinia cærulea.*
Pilotfish		*Naucrates ductor.* *Seriole zonata.*
Pinfish	Bream, salt-water bream	*Lagodon rhomboides.*
Pollock		*Pollachius virens.*
Pompano		Trachinotus sp. (Atlantic coast). *Palometa simillimus* (Pacific coast).

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in bureau reports	Other common names	Scientific names
Porgies	Porgee	Calamus sp.
Porkfish	Sisi	*Anisotremus virginicus.*
Quillback	Spearfish or skimfish	Carpiodes sp.
Roach	Shiner	*Notemigonus crysoleucas.*
Rock bass	Sand bass Red-eye, goggle-eye	Paralabrax sp. (Pacific coast). *Ambloplites rupestris* (Mississippi River and tributaries).
Rockfishes	Rock cod	Sebestodes sp. (Pacific coast).
Rosefish		*Sebastes marinus.*
Sablefish	Black cod	*Anaplopoma fimbria.*
Salmon:		
Atlantic		*Salmo salar* (Atlantic coast).
Pacific—		
Blueback, red or sockeye.		*Oncorhynchus nerka.*
Chinook, or king	Tyee, Columbia, Sacramento, spring	*Oncorhynchus tschawytscha.*
Chum or keta	Dog salmon	*Oncorhynchus keta.*
Humpback or pink.		*Oncorhynchus gorbuscha.*
Silver or coho		*Oncorhynchus kisutch.*
Steelhead		(See steelhead trout.)
Sauger pike	Sand pike	*Stizostedion canadense.*
Sawfish		*Pristis pectinatus.*
Scamp		*Mycteroperca phenax.*
Sculpin		Cottidæ sp.
Scup	Paugy or porgy, fair maid	*Stenotomus chrysops.*
Sea bass	Black jewfish or black sea bass Black sea bass	*Stereolepis gigas* (Pacific coast). *Centropristes striatus* (Atlantic coast).
Sea bass, white (California)		*Cynoscion nobilis* (Pacific coast).
Sea gar	Needlefish, billfish, houndfish	Tylosurus sp.
Sea robin		Prionotus sp.
Shad	American shad	*Alosa sapidissima.*
Sharks		Carcharodon sp.; Mustelus sp.; Carcharhinus sp.; Sphyrna sp.
Sheepshead (salt-water)		*Archosargus probatocephalus.*
Sheepshead (fresh-water)	Drum, fresh-water	*Aplodinotus grunniens.*
Sheepshead (Pacific coast)	Redfish, flat head	*Pimelometopon pulcher.*
Silversides	Spearing	Menidia sp.
Silver perch	Sand perch	*Bairdiella chrysura.*
Skates		Raja sp.
Skipjack	Striped tuna	*Euthynnus pelamys*
Skipper	"Billfish"	*Scomberesox saurus.*
Smelt		*Osmerus mordax* (Atlantic coast). Argentinidæ sp. (Pacific coast).
Snapper, Mangrove	Gray snapper	*Lutianus griseus.*
Snapper, red		*Lutianus blackfordii.*
Snook	Robalo, sergeantfish	*Centropomus undecimalis.*
Sole		*Psettichthys melanostictus* (Pacific coast).
Spadefish		*Chaetodipterus faber.*
Spanish mackerel		*Scomberomorus maculatus.*
Splittail		*Pogonichthys macrolepidotus.*
Spot	Lafayette, goody	*Leiostomus xanthurus.*
Squawfish	Sacramento pike	*Ptychocheilus oregonensis.*
Squeteague (gray)	Gray trout, weakfish, trout	*Cynoscion regalis.*
Squeteague (spotted)	Spotted weakfish, spotted trout	*Cynoscion nebulosus.*
Squirrelfish		*Diplectrum formosum.*
Steelhead trout	Salmon trout	*Salmo gairdneri.*
Stingray		Dasyatis sp.
Striped bass	Rockfish, rock	*Roccus lineatus.*
Sturgeon		Acipenser sp.
Sturgeon, shovel-nosed		*Scaphirrhynchus platorynchus.*
Sucker	Fresh-water mullet	Catostomidæ sp.
Sunfish		Lepomis sp. Centrarchidæ sp.
Surf fishes		Embiotocidæ sp.
Swellfish	Puffer, swell toad, balloonfish, globefish.	*Spheroides maculatus.*
Swordfish		*Xiphias gladius.*
Tang		Hepatus sp.
Tarpon	Silver-king	*Tarpon atlanticus.*
Tautog	Blackfish, oysterfish	*Tautoga onitis.*
Tenpounder	Elops	*Elops saurus.*
Thimble-eyed mackerel	Bull's-eye	*Scomber colias.*
Tilefish		*Lopholatilus chamæleonticeps.*
Tomcod		*Microgadus tomcod* (Atlantic coast). *Microgadus proximus* (Pacific coast).
Tripletail		*Lobotes surinamensis.*
Tuna	Bluefin tuna, tunny, horse mackerel, leaping tuna.	*Thunnus thynnus.*
Turbot	Greenland halibut, American turbot	*Reinharditus hippoglossoides.* *Balistes carolinensis.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in bureau reports	Other common names	Scientific names
White bass	White lake bass	*Roccus chrysops.*
Whitebait		Small fry of any fish.
Whitefish		*Coregonus clupeiformis* (Great Lakes). *Caulolatilus princeps* (Pacific coast).
Whitefish (Menominee)		*Coregonus clupeaformis.*
Whiting	Silver hake	*Merluccius bilinearis.*
Wolffish		*Anarrhichas lupus.*
Yellow bass		*Morone interrupta.*
Yellow perch		*Perca flavescens.*
Yellow pike	Wall-eyed pike, pike perch, dore	*Stizostedion vitreum.*
Yellowfin tuna		*Neothunnus macropterus.*
Yellowtail		*Ocyurus chrysurus* (Atlantic coast). *Seriola dorsalis* (Pacific coast).
Wahoo		Acanthocybium solandri.
Abalone		Halotis sp.
Clams:		
Hard	Round clam, cherrystone, quahog, little neck.	*Tivela stultorum* (Pacific coast). *Venus mercenaria* (Atlantic coast). *Venus mortoni* (Florida coast).
Cockle		*Cardium corbis.*
Soft	Sand clam, soft-shelled clam, nannynose, maninose.	*Mya arenaria.*
Razor (Atlantic)		Siliqua sp.; Tagelus sp.
Razor (Pacific)		*Siliqua patula.*
Pismo		*Tivela stultorum* (Pacific coast).
Conchs		Strombus sp. Busycon sp.
Crabs:		
Stone		*Menippi mercenaria.*
Soft	Soft-shelled crab, blue crab	*Callinectes sapidus.*
Hard	Hardshell crab, blue crab	Do.
	Dungeness crab	*Cancer magister* (Pacific coast).
	Rock crab, hard crab	*Cancer irroratus* (Atlantic coast).
King	Horseshoe crab	Limulus.
Spider	Toad crab	*Hyas coarctatus.*
Crawfish	Crayfish	Cambarus sp. (Atlantic coast). Astacus sp. (Pacific coast).
Lobsters:		
Common		*Homarus americanus* (Atlantic coast).
Spiny	Rock lobster, crayfish	*Panulirus interruptus* (Pacific coast). *Panulirus argus* (Atlantic coast).
Mussels		*Mytilus californianus* (Pacific coast). *Mytilus edulis.*
Octopus		*Octopus punctatus* (Pacific coast).
Oysters:		
Eastern		*Ostrea elongata.*
Western	Olympia	*Ostrea lurida* (Pacific coast).
Japanese (introduced)		*Ostrea gigas.*
Periwinkles		Littorina sp.
Scallops:		
Sea		*Pecten magellanicus.*
Bay		*Pecten irradians* (Atlantic coast). *Pecten æquisulcatus* (Pacific coast).
Shrimp		*Peneus setiferus.* *Peneus brasiliensis* (Atlantic and Gulf coasts). Pandalus sp. (Pacific coast). Pandalopsis sp. (Pacific coast). Crangon sp. (Pacific coast).
Snails		Gastropoda sp.
Squid		*Loligo opalescens* (Pacific coast). *Loligo pealei* (Atlantic coast).
Turtles:		
Green		*Chelonia mydas.*
Loggerhead		*Thalassochelys caretta.*
Hawksbill		*Chelonia inbricata.*
Snapping	Mud turtle, mossback	*Chelydra serpentina.*
Terrapin	Diamond-back terrapin	*Malacoclemmys palustris.*
Frogs		Rana sp.
Irish moss		*Chondrus crispus.*
Kelp		Macrocystis sp.; Nereocystis sp.; Pelagophycus sp.; Alaria sp.
Sponges:		
Glove		*Spongia graminea* (Hyatt) *Euspongia officianalis* (L.).
Grass		*Hippospongia equina cerebriformis.*
Sheepswool		*Hippospongia canaliculata gossypina.*
Yellow		*Hippospongia equina elastica.*
Trepang	Sea cucumber	*Cucumaris frondosa; Thyone briareus.*

STATISTICAL SURVEY PROCEDURE

METHODS OF COLLECTION

In order that persons using the statistics in this report may judge as to their completeness and authenticity, there follows an outline of the methods employed by the bureau in collecting fishery statistics. It will be noted that several methods are used. Each, in so far as possible, is the most efficient that can be developed to accomplish the desired result with the available personnel.

General fishery statistics.—The purpose of collecting general fishery statistics is to obtain statistics on the catch of fishery products and its value as landed by the fishermen, the quantity or number of each kind of gear used, the number of fishing boats, the number and net tonnage of fishing and transporting vessels, the number of wholesale establishments, the amount of wages and salaries paid in these establishments, the quantity and value of products prepared, and the number of persons engaged in each phase of the industry.

The scope of the coastal surveys includes the commercial fisheries of the oceans, bays, and coastal rivers as far inland as commercial fishing is important. This usually coincides with the range of commercial fishing for anadromous species. Statistics of the fisheries of the Mississippi River include the fisheries of the Mississippi River proper, as well as all tributaries wherein commercial fishing for either fish, crustaceans, or mollusks is prosecuted. Statistics of the lake fisheries include those prosecuted in the Great Lakes, adjacent bays, and the international lakes of northern Minnesota, as well as certain rivers having outlets into these waters.

General statistics of the fisheries for all sections of the United States have not been collected on an annual basis, although the data for 1929 include all the commercial fisheries of the marine and lake sections and the fresh-water mussel fishery of the Mississippi River and tributaries.

In conducting these surveys it is the custom of the bureau to dispatch agents to the districts to be surveyed early in the calendar year. They obtain statistics on operations during the previous calendar year, except that statistics of the oyster fishery are obtained for the season ending in the spring of the following year. The agents conducting these surveys are trained men or recruits working under the close supervision of trained men. Recruits are permitted to work individually only after proving a satisfactory aptitude for the work during their training period. While it is impossible for the few agents available to interview each fisherman in a given locality, the more important ones are visited and a sufficient number of those of lesser importance are interviewed to obtain reliable information on their production. In practice, virtually all wholesale firms are visited, as well as captains of fishing vessels (those of 5 net tons or over) and also all the more important shore fishermen and representative small producers.

As an aid in locating fishermen, lists of vessel and motor-boat owners are obtained from local customs houses. It is also often possible to obtain the names of licensed commercial fishermen and occasionally some statistics of the catch from the various State fishery agencies. In the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained from the State agencies in recent years that only fragmentary surveys are made by the bureau to supplement missing data. Virginia has recently adopted a very complete statistical plan.

For the Great Lakes and international lakes of northern Minnesota the bureau obtains catch statistics and usually the value of the catch direct from the State records. To obtain data on the fishermen, boats, vessels, and gear the bureau conducts such personal surveys among the fishermen as may be necessary to supplement the State records. Annual catch statistics are available since 1913.

Agents are stationed at Seattle, Wash., who survey each of the Pacific Coast States annually to supplement data that are missing from the State records. In most cases the value of the catch is derived from dealers' records and from estimates of prices. In Washington and Oregon the offshore fisheries are surveyed separately for units of operation, catch, and value of the catch. In almost all other respects the statistics are as collected by the States. Statistics of the wholesale industry for this section are obtained largely by personal interview.

The fisheries of Alaska are conducted primarily by large operators. Sworn statements are required from these operators concerning their operations. These are collected and compiled by the Alaska division of this bureau. Bulletins containing statistics for each district are released following the survey.

Landings at certain important United States ports.—Statistics of the landings at the principal New England ports—Boston and Gloucester, Mass., and Portland, Me.—are similarly obtained. An agent is permanently stationed at each of these ports. His duties include the obtaining of statistics on the quantity of fish landed each day by each fishing vessel, the value of such fish landed, information concerning the date of departure and arrival of the vessel, and also a list of the grounds from which the fish were taken and the gear used in their capture. These statistics are forwarded to the bureau, where compilations are made. Monthly statistical bulletins are issued for these landings as well as annual bulletins summarizing the year's activities.

Statistics of the landings of fish at Seattle, Wash., are collected by the bureau's agent at that place. Landings are classified as those made by American fishing vessels and those received by Seattle wholesale dealers. The landings credited to United States fishing vessels are made by vessels operating distinctly as primary fishing units, usually in the offshore fisheries, while those credited as received by wholesale dealers are usually products of the shore fisheries collected mainly from points in Puget Sound and do not include fish received from Alaska or Canada, or landings made by the halibut fleet. Monthly statistical bulletins are issued for these landings as well as annual bulletins summarizing the year's activities.

Statistics of the combined landings of fish at New York City and Groton, Conn., are obtained by J. H. Matthews, executive secretary of the United States Fisheries Association. Statements of these landings are forwarded to the bureau, where they are compiled. These statistics have not included the value of the catch. Monthly bulletins including these data are not issued; however, a summary is published in this document.

Statistics of the fishery products handled at the municipal wharf, Washington, D. C., are reported to the bureau daily by agents of the city health department. These are compiled on an annual basis. They are not published in bulletin form, but a summary of the year's activities is published in the annual report of this division.

Atlantic mackerel fishery.—Complete statistics on the catch by the Atlantic mackerel fleet are obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Me., with those obtained by agents who in recent years have been stationed at other Atlantic ports where mackerel are landed. These agents obtain data on each fare of mackerel landed, similar to the data obtained on the landings by fishing vessels at the three New England ports. Complete statistics of this fishery appear only in the annual reports of this division, although the landings at the principal New England ports appear in the monthly and annual bulletins published for those ports.

Shad and alewife fisheries.—Due to the importance of the Hudson and Potomac Rivers in the production of shad, surveys for statistics of the catch, value of the catch, and operating units are made annually. On the Potomac River similar statistics also are obtained for the alewife fishery. The surveys are conducted by agents in a manner similar to that employed in the collection of general fishery statistics, except that probably more fishermen are interviewed as great care is exercised to make these canvasses as accurate as possible.

The State of New York obtains statistics for the fisheries of the Hudson River that closely parallel those desired by the bureau for this fishery, which alleviates the work on this river. Both Maryland and Virginia issue licenses for fishing, which give a very satisfactory list of fishermen for the agents surveying the Potomac River.

Statistics of the shad and alewife fisheries are not published separately in bulletin form, but a summary of the year's activities is published in the annual report of this division.

Sponge market, Tarpon Springs.—A large proportion of the total output of sponges in Florida is handled through the sponge exchange at Tarpon Springs. In view of this, the bureau has arranged with a representative of the exchange to furnish statistics of the quantity and value of the sponges, by variety classification, handled through it annually. Statistics of the quantity of sponges handled through the exchange are not published in bulletin form, but a summary of the year's activities is published in the annual reports of this division.

Fisheries of Lakes Pepin and Keokuk.—As a means of ascertaining the effect of the Keokuk Dam upon the fisheries of the upper Mississippi River, annual statistics of the fisheries of Lakes Pepin and Keokuk are obtained by personal surveys conducted by employees of the bureau at the Fairport (Iowa) biological station and the La Crosse (Wis.) fish-cultural station. Their methods are like those employed in the general surveys. The statistics are not published in bulletin form, but summaries of production appear in the annual reports of this division.

Fisheries of the Mississippi River.—Statistics on that portion of the Mississippi River lying between Lakes Keokuk and Pepin are collected as a part of the survey for the two lakes. Statistics covering this production are not available in bulletin form but a summary appears in this report.

Annual surveys for statistics of the production of fresh-water mussel shells are made by questionnaire supplemented by personal canvass. A summary of the production appears in this report.

Pacific halibut fishery.—Statistics of the Pacific halibut fishery are obtained by the bureau's agent in Seattle, aided by bureau representatives in Alaska, American consuls in British Columbia and the International Halibut Commission. The fleet classification has been arbitrarily applied by including in the "Washington fleet" all vessels that land more than half of their catch in that State. All other American vessels of the halibut fleet are included in the Alaska fleet. Monthly and annual statistical bulletins are available on this fishery, being published along with the statistics of the landings of fishery products at Seattle, Wash.

Canned fishery products and by-products trade.—Beginning in 1921, the bureau has made annual surveys for statistics of the canned fishery products and by-products industries. These are begun the first week in January of each year for statistics of the production in the preceding year. The surveys occupy usually 6 to 9 weeks' time. During this period agents visit each plant in the United States where there is a production of canned fishery products or by-products. They obtain statistics of the production and value of the production for each commodity. In rare instances, where plants are not easily reached by regular transportation facilities, returns are obtained by mail.

Statistics on the production of marine pearl-shell products were included in this survey for the first time in the data for 1930.

The value shown for canned products constitutes the gross amount received by the packer at the production point, no deductions being made for commissions or expenses.

Statistics of the canned fishery products and by-products produced in Alaska are received on the same sworn statements that include statistics of the general fisheries. An annual statistical bulletin is issued on this trade.

Cured fishery products trade.—Statistics of the products of this trade are collected as part of the surveys for general fishery statistics. A bulletin showing this production was issued for the year 1929.

Packaged-fish trade.—Complete statistics of the annual production and value of fish packaged in the United States are obtained as a part of the survey for statistics of the canned fishery products and by-products industries. These statistics are published in bulletin form annually.

Cold-storage holdings of fish.—An arrangement has been made with the Bureau of Agricultural Economics, Department of Agriculture, whereby statistics of the cold-storage holdings of the various species of fish, by sections of the United States, are furnished to this bureau monthly. Included with statistics of the holdings is a statement of the quantity of the various species of fish frozen and also the holdings of cured fish. Bulletins showing these statistics are issued monthly as well as annually.

Foreign fishery trade.—Statistics on the foreign fishery trade are obtained from compilations made by the Bureau of Foreign and Domestic Commerce. Statistics of all known fishery products imported or exported are assembled in one table and published annually in the report of this division.

COMPILATION PRACTICES

Certain practices of importance used in the compilation of fishery statistics are explained below:

Days absent.—In computing "days absent" for vessels landing fares at the various ports, the day of departure and the day of arrival are included; thus, a vessel leaving port on the 8th of the month and returning on the 15th of the month will be shown as being absent eight days.

Operating units.—Operating units as referred to in this document include persons engaged and fishing craft and gear employed.

Vessels.—The term "vessels" refers to craft having a capacity of 5 net tons or greater.

Incidental catch.—The term "incidental catch" refers to the catch of certain species by a type of gear which ordinarily does take appreciable amounts, if any, of such species.

Percentages.—Percentages are usually shown as whole numbers. Fractions of per cents are dropped if less than five-tenths, and the percentage is raised to the next higher integer if the fraction is greater than five-tenths. If the fraction is exactly five-tenths, the integer is raised or lowered to make it an even number.

Converting.—Many of the figures shown in the statistical tables published herewith have been reduced to thousands of pounds or dollars. In making these conversions the largest number from which a group of items is computed is raised or lowered to the nearest thousands place. If the number ends in an even 500, the thousands integer is raised or lowered to make it an even number. The individual items are changed to conform to the total thus obtained.

Conversion factors.—The principal conversion factors that have been used in this report are as follows:

Alewives	To convert number of fish to weight in pounds multiply by 0.4.
Clams, hard	To convert bushels to pounds of meat multiply by 8.
Clams, soft	To convert bushels to pounds of meat multiply by 10.
Cod, large, salted	To convert to fresh-gutted weight multiply by 1.90.
Cod, market, salted	To convert to fresh-gutted weight multiply by 1.94.
Cod, scrod, salted	To convert to fresh-gutted weight multiply by 1.98.
Cod, all sizes, fresh gutted	To convert to round weight multiply by 1.25.
Crabs, blue (hard and soft)	To convert number of crabs to weight in pounds multiply by 0.333.
Cusk, salted	To convert to fresh-gutted weight multiply by 1.90.
Haddock, large, salted	To convert to fresh-gutted weight multiply by 2.06.
Haddock, scrod, salted	To convert to fresh-gutted weight multiply by 2.10.
Haddock, fresh-gutted, all sizes	To convert to round weight multiply by 1.25.
Hake, large, salted	To convert to fresh-gutted weight multiply by 1.90.
Hake, small, salted	To convert to fresh-gutted weight multiply by 1.98.
Halibut, salted	To convert to fresh-gutted weight multiply by 2.
Herring, salted	To convert to round weight multiply by 1.50.
Mackerel, salted	To convert to round weight multiply by 1.35.

Menhaden	To convert number of fish to weight in pounds multiply by 0.6.
Oysters	To convert bushels to pounds of meat multiply by 7.
Oil (east coast)	To convert gallons to pounds multiply by 7.5.
Oil (west coast)	To convert gallons to pounds multiply by 7.74.
Pollock, salted	To convert to fresh-gutted weight multiply by 1.90.
Scallops	To convert bushels to pounds of meat multiply by 6.
Sponges, dried (Florida):	
Large wool	To convert number of sponges to weight in pounds multiply by 2.5.
Small wool	To convert number of sponges to weight in pounds multiply by 1.
Glove	To convert number of sponges to weight in pounds multiply by 1.5.
Grass	To convert number of sponges to weight in pounds multiply by 2.5.
Wire	To convert number of sponges to weight in pounds multiply by 1.5.
Yellow	To convert number of sponges to weight in pounds multiply by 1.5.

Parties wishing to receive current copies of this report and statistical bulletins issued by the bureau should request that their names be placed on the bureau's mailing list No. 128 for the annual statistical report, No. 128a for general statistical bulletins, and No. 128b for monthly cold-storage reports.

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PROGRESS IN BIOLOGICAL INQUIRIES, 1930[1]

By ELMER HIGGINS, *Chief, Division of Scientific Inquiry*
(With the collaboration of investigators)

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[1] Appendix III to the Report of the U. S. Commissioner of Fisheries for 1931. Approved for publication, July 30, 1931.

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INTRODUCTION

Progress in biological investigations during the year 1930 as conducted by the bureau's division of inquiry respecting food fishes, has been most gratifying. According to our present views, the program of scientific research shows a better balance between the theoretical and the practical aspects of fishery science and aquatic biology and a more satisfactory distribution of projects among the various sections of the country and the fishery industries than ever before. There are still many gaps in the program. Many fisheries are threatened by depletion. Means of augmenting the fish supply in many localities must still be devised. Many of the very principles of fishery conservation still await discovery. However, through the adoption of a well-rounded research plan, made possible by the act of May 21, 1930, known as the 5-year construction and maintenance program for the United States Bureau of Fisheries, we are confident that results of practical benefit will accrue to the fishery industries, to the game-fish angler, and to the country at large that many times outweigh the expenditures involved.

Although the functions of the Bureau of Fisheries have been vastly enlarged since its establishment in 1871 by the organization of first, the division of fish culture, then the division of fishery industries, and later, the Alaska division, the division of inquiry still discharges many of the original functions of the old Fish Commission, especially those of prosecuting the necessary inquiries, chiefly biological in character, regarding the occurrence and the extent of declines in the number of food fishes in the coastal and interior waters, of discovering what the causes of such declines may be, and of devising and recommending means of overcoming such declines either by regulatory legislation or by more positive and direct means of augmenting the resource.

The marine fishes of the Atlantic and Pacific coasts support a tremendous food industry. No longer are new fishing grounds being discovered as in former years, but the exploitation of the more productive grounds has increased rapidly during the past decade. Hence, the outstanding problem of these fisheries receiving first attention by the division of inquiry is that of proper husbanding of the supply in order that the resource may be utilized to the fullest extent compatible with its maintenance in a state of maximum productivity. In the North Atlantic area, the fisheries are being critically studied to discover at the earliest moment signs of depletion from overfishing, and the factors that govern fish reproduction are being examined so that advance information regarding fluctuations in abundance may be made available to the industry. On the Pacific coast inquiries of a similar sort are being prosecuted, and in the Alaska fisheries, the results of such investigations find immediate application in the drafting of fishery regulations imposed by the Federal Government. Fisheries in the interior waters, aside from those in the Great Lakes, are prosecuted primarily for sport and recreation. The tremendous increase in the army of anglers, coupled with industrialization and resulting stream pollution in the eastern half of the country have placed an intolerable strain upon the fish supply; and investigations are, therefore, directed toward the intelligent restocking of depleted waters, toward the perfection of fish cultural methods for such purposes, and toward overcoming the pollution menace. The shellfish resources of our coast line have been an important food resource since earliest times, and recent researches as to their dietary values enhance rather than detract from their importance as a healthful food. Unrestrained harvesting of the natural supply has led to marked depletion in many areas, and the view is rapidly gaining popular acceptance that the adoption of modern methods of farming of oysters, clams, and other mollusks, either by private initiative or through rigid State regulation, is the only practicable means of restoring the productivity of our shellfish beds. The bureau investigations are, therefore, directed to that end with gratifying results that appear to be fully appreciated by the industry. Minor problems of research conducted by the division all tend toward the solution of these practical problems of the fisheries. The period of exploration and description reached its height during the last century and has passed. More modern methods of experimental biological and statistical analysis have taken its place, and fisheries research is rapidly assuming the form and content of an exact science.

In previous reports mention has been made of extensive cooperation in fishery research by States and other institutions. During the past year, cooperation still greater than ever before has been accorded. In addition to the occasional support and encouragement in specific projects such as the furnishing of boats, men, gear, or other services rendered by the various States and which have been continued through the past year, large-scale projects have been assumed by several States on scientific programs, supervised by the bureau's staff. So complete has been the States' confidence in certain undertakings that considerable funds have actually been deposited in the United States Treasury for disbursement on these cooperative projects by bureau investigators. Such cooperation, which is gratefully acknowledged, is in most cases mentioned in connection with the various investigations in the following pages.

Investigators of the division of scientific inquiry have continued to participate in the activities of the North Amercan Council on Fishery Investigations. The seventeenth meeting of this organization was held in Washington on November 6 and 7, 1930. The nations represented were Canada, Newfoundland, France, and the United States. All of these nations have important interests in fisheries of the western North Atlantic and all of them are engaged to a greater or lesser degree in conducting scientific investigations with a view to developing and conserving the fishery resources. The purpose of the meetings of this organization is to coordinate the program of research of the several nations with respect to high seas fishery problems.

In the membership of the council the United States is represented by Dr. H. B. Bigelow, chairman, Museum of Comparative Zoology, Cambridge, Mass.; by Henry O'Malley, Commissioner, and Elmer Higgins, chief of the division of scientific inquiry, both of the U. S. Bureau of Fisheries. Canada is represented by W. A. Found, Deputy Minister of Fisheries, Ottawa, and Dr. A. G. Huntsman and Prof. J. P. MacMurrich, of the Biological Board of Canada. Newfoundland's representatives were H. B. C. Lake, Minister of Marine and Fisheries, St. Johns, Newfoundland; and Dr. Harold Thompson of the Scottish Fishery Board, stationed for the present at St. Johns. France is represented by Dr. Ed. le Danois, director, Office Scientifique et Technique des Pêches Maritimes, Paris.

A wide range of subjects relating to the practical and scientific problems of the fisheries occupied the attention of the committee during its 2-day session. Reports were received from members of the committee and from a number of investigators attending the session as guests on investigations of the cod, haddock, mackerel, herring, squid, Passamaquoddy power project, ocean currents and temperatures, and fishery statistics. Particularly interesting contributions were made by O. E. Sette and W. C. Herrington, of the North Atlantic staff of the Bureau of Fisheries, who outlined their respective investigations on the mackerel and the haddock.

One of the high lights of the committee's session was Doctor le Danois's exposition of his research in the waters off the coast of Europe and on this side of the Atlantic. Investigations of the water on the other side disclosed that mid-Atlantic water pushes to the northward every summer and recedes in the winter, and that this movement is particularly pronounced in certain years. Every 18 years there seems to be an exceptional movement of this warm water. It appears that in the years of this movement of tropic waters northward there is impaired success of the codfishery in its southern range on the Grand Banks, forcing the fishermen to fish the waters northward in order to make good catches. It has been because of the movements of the fish northward in the past two or three years that fishermen from Europe have come to Greenland in unprecedented numbers.

While heretofore Newfoundland has been able to contribute little aid to scientific research in the North Atlantic region, it is at the present time embarking on such investigations on a considerable scale. Dr. Harold Thompson, well-known fishery investigator of the Scottish Fishery Board, has just completed a preliminary survey of the requirements of a program of practical and scientific fishery investigations in Newfoundland, and is planning a sound program of study employing the facilities of a laboratory ashore and a research trawler at sea from funds to be furnished jointly by the Newfoundland Government and the British Empire Marketing Board. Through the efforts of the North American Council, Doctor Thompson's proposed studies will be closely correlated with those conducted by the French authorities on the Grand Banks and by the other Governments.

Much interest was shown in the program of investigation of the newly established Woods Hole Oceanographic Institution, of which the chairman of the council, Doctor Bigelow, is director. The committee urged the importance of obtaining more exact knowledge of ocean currents and temperatures in the North Atlantic region, because of the direct effects of such phenomena upon the fish life. It formally requested that institution to undertake at once a study of the results already obtained from the many drift-bottle experiments conducted by the several countries, and to correlate the findings bearing on the broader aspects of ocean circulation.

The committee also gave further consideration to the probable effects on the fisheries of the damming of Passamaquoddy Bay for hydroelectric power and reiterated its previous stand as to the importance of not only settling the controversial problems but of obtaining a proper understanding of the fishery situation of the region in general.

During the year 15 scientific or administrative reports were published under the supervision of the division or as a result of investigations of its staff. The list of papers follows:

Coker, Robert E.
Studies of common fishes of the Mississippi River at Keokuk. Bulletin, Vol. XLV, 1929, 87 pp., 30 illus. Document No. 1072.

Davis, H. S., and A. H. Wiebe.
Experiments in the culture of the black bass and other pond fish. Appendix IX, Report of Commissioner, 1930, 29 pp., 6 illus. Document No. 1085.

Davis, H. S., and R. F. Lord, Jr.
Experiments with meat and meat substitutes as trout foods. Appendix VII, Report of Commissioner, 1930, 27 pp., 11 illus. Document No. 1079.

Federighi, Henry.
Control of the common oyster drill. Economic Circular No. 70, 7 pp., 5 illus.

Galtsoff, Paul S.
Destruction of oyster bottoms in Mobile Bay by the flood of 1929. Appendix XI, Report of Commissioner, 1929, 20 pp., 3 illus. Document No. 1069.

Galtsoff, Paul S., and R. H. Luce.
Oyster investigations in Georgia. Appendix V, Report of Commissioner, 1930, 42 pp., 23 illus. Document No. 1077.

Galstoff, Paul S., H. F., Prytherch, and H. C. McMillin.
An experimental study in production and collection of seed oysters. Bulletin, Vol. XLVI, 1930, 69 pp., 40 illus. Document No. 1088.

Higgins, Elmer.
Progress in biological inquiries, 1928, including extracts from the proceedings of the divisional conference January 2 to 5, 1929. Appendix X. Report of Commissioner, 1929, 115 pp. Document No. 1068.

Hildebrand, Samuel F.
The Bureau of Fisheries and its biological station at Beaufort, N. C. Economic Circular No. 72, 14 pp., 9 illus.

Prytherch, Herbert F.
Improved methods for the collection of seed oysters. Appendix IV, Report of Commissioner, 1930, 15 pp., 9 illus. Document No. 1076.

Rounsefell, George A.
Contribution to the biology of the Pacific herring, *Clupea pallasii*, and the condition of the fishery in Alaska. Bulletin, Vol. XLV, 1929, 96 pp., 53 illus. Document No. 1080.

Schroeder, William C.
Migrations and other phases in the life history of the cod off southern New England. Bulletin, Vol. XLVI, 1930, 138 pp., 33 illus. Document No. 1081.

THOMPSON, SETON H.
Salmon tagging in Alaska, 1929. Bulletin, Vol. XLVI, 1930, 21 pp., 6 illus. Document No. 1084.
WIEBE, A. H.
Investigations on plankton production in fish ponds. Bulletin, Vol. XLVI, 1930, 42 pp., 6 illus. Document No. 1082.

In addition to these, the following papers were published by the staff during the past year in other than the bureau's series:

CRAIG, JOSEPH A.
An analysis of the catch statistics of the striped bass (*Roccus lineatus*) fishery of California. Fish Bulletin, No. 24, Division of Fish and Game of California, pp. 1–41. Sacramento.
DAVIDSON, F. A.
Graphical and mathematical treatments in growth studies. Contributions to Marine Biology. Stanford University Press.
Interpretations of the curve of normal growth. Science, Vol. LXXII, No. 1861, p. 226. Lancaster, Pa.
DAVIS, H. S.
Some principles of bass culture. Transactions, American Fisheries Society, Vol. LX, pp. 48–52. Hartford.
Investigations in pond-fish culture at the Fairport Biological Station. Transactions, American Fisheries Society, Vol. LIX, pp. 86–93. Hartford.
DAVIS, H. S., and R. F. LORD.
The use of substitutes for fresh meat in the diet of trout. Transactions American Fisheries Society, Vol. LIX, pp. 160–167. Hartford.
ELLIS, M. M.
Artificial propagation of fresh-water mussels. Transactions, American Fisheries Society, Vol. LIX, pp. 217–223. Hartford.
GALTSOFF, PAUL S.
The rôle of chemical stimulation in the spawning reactions of *Ostrea virginica* and *Ostrea gigas*. Proceedings, National Academy of Science, Vol. XVI, No. 9, pp. 555–559. Easton, Pa.
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NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

The provision of additional funds during the past year has made it possible to expand the scientific studies to include practically all of the more important sea fisheries of this region. In order of their commercial importance the fisheries now being investigated are: Haddock, cod, mackerel, flounder, and the group of species (squeteague, scup, butterfish, etc.), comprising the bulk of the commercial catch alongshore from southern New England to Delaware Bay. The objective is to understand the causes of changes in the fish population, their implications as to the future of the industry, and to be in a position to recommend corrective measures if such should prove necessary.

So little is known about the biological economy of the sea, and so imperfect are the records of man's inroads on its edible stores that the task becomes a group research problem of almost incredible complexity. It involves such diverse inquiries as the determination of the feeding habits of minute newly hatched fish larvæ and the appraisal of the efficiency of various types of commercial fishing gear. The main approaches toward a solution are to derive a measure of changes in abundance from the records of commercial catches through a series of years, to examine samples of the fish population for clues given by the age of the individuals as to the rate of replacement in relation to the loss from natural mortality as well as the toll taken by man, to study the drift of eggs and larvæ for information on the sources of recruits to the fishing grounds, to mark fish with tags to see whether their movements from one ground to another may be the cause of changes in yield, and to study the effects of oceanic conditions on the nurture, movements, and even survival of the species under consideration.

To provide for the cooperation necessary in such a many-sided task, the scientific staff has been centralized at Cambridge, Mass., where laboratory and library facilities have been generously provided by the Museum of Comparative Zoology. This not only has the advantage of coordinating the work, but also makes it possible to consult readily members of the zoological, physiological, physical, and chemical departments of Harvard University, when problems arise requiring special knowledge in particular fields. Especially valuable has been the constant advice of Prof. Henry B. Bigelow, curator of oceanography, whose extensive experience and intimate knowledge of oceanic phenomena off our Atlantic coast has always been available to guide the course of our studies.

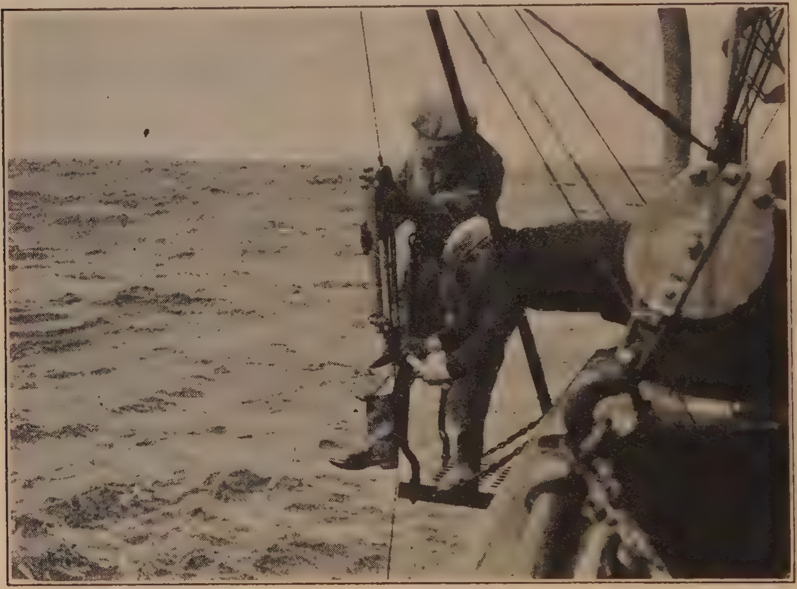

FIGURE 1.—Oceanographic work aboard the *Albatross II*. Attaching a messenger to a Green-Bigelow water bottle used to secure a series of water samples and temperature at various depths

Equally gratifying have been the results of cooperation with the Bingham Oceanographic Foundation of Yale University. Prof. A. E. Parr, curator of that institution, has kindly given generously of his time to supervise the studies on the spawning of food fishes and growth of their young in the Delaware Bay region, and his findings already have provided valuable links in the chain of circumstances governing the maintenance of the squeteague fishery.

The progress made during 1930 on the various projects included in the research work on the North and Middle Atlantic coast is summarized in the following sections.

OCEANOGRAPHIC STUDIES

Perhaps the outstanding result of fishery investigations both in this country and abroad during the last two decades has been the recognition of the fact that many of the changes in abundance of fishes which cause the ups and downs in commercial yields are largely due to variations in the reproductive success in different years. It appears that conditions in certain years are favorable to the survival of the spawning product of certain species; other years'

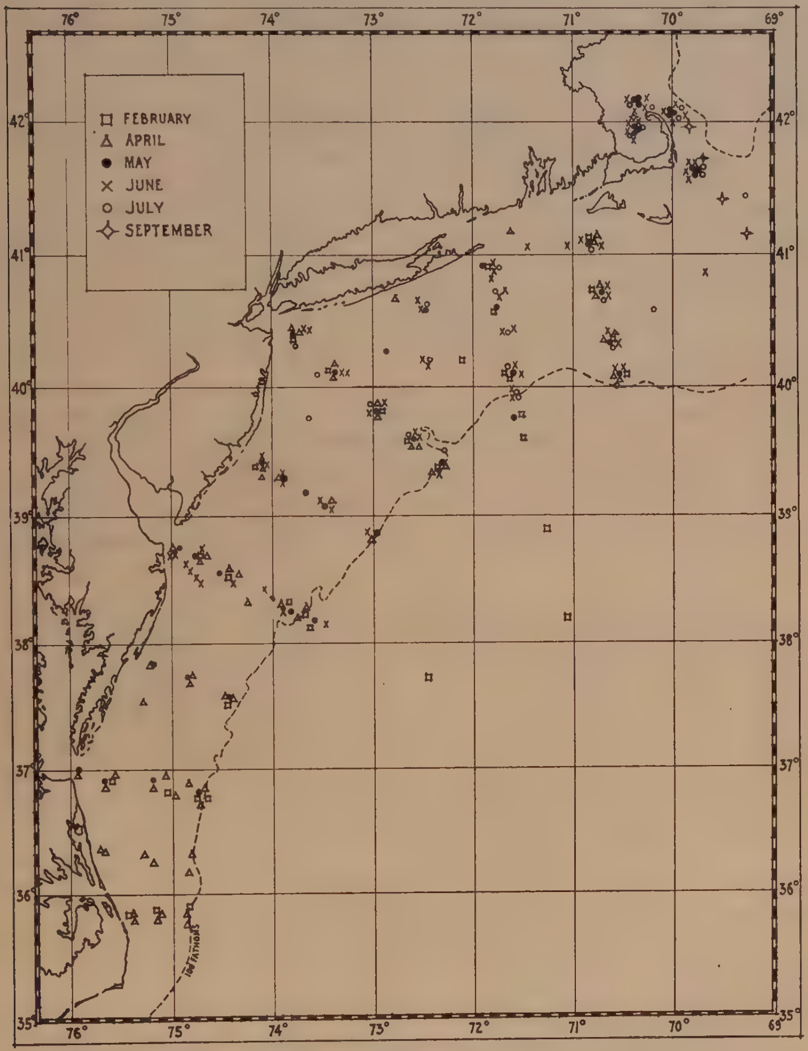

FIGURE 2.—Chart of the Atlantic coast of the United States from Cape Cod to Cape Hatteras, showing the oceanographic stations of the *Albatross II* during 1930

conditions may result in virtually total mortality of the young which that year might have contributed to the stock. These successes or failures leave their impress on the population so that the yield of the commercial fishery in subsequent years will be large or small depending on whether the year classes have to a large degree survived or have to a large degree perished.

The prevalence of this phenomenon in the sea fisheries makes it important to examine the conditions that may be responsible for the survival of year classes. To this end our investigations on fishes proper have been accompanied by studies of oceanographic conditions in so far as the limited means at our disposal would permit. Results of such studies can not be forthcoming in a short time. They involve continuous observations over a series of enough years to establish a norm from which departures may be measured and correlated with changes in abundance as measured by the yield of the commercial fisheries in subsequent years. For this reason progress during the current year must be measured by the degree to which it lays the foundation for future advancement, as well as by the immediate results obtained.

Most of the oceanographic work was done during the repeated visits of the *Albatross II* to the mackerel-spawning areas which cover an expanse of offshore waters extending from North Carolina to Massachusetts, usually including the full width of the continental shelf. The accompanying chart indicates the distribution of stations, while the kinds of observations made during the cruises are listed in Table 1.

TABLE 1.—*Summary of offshore oceanographical work done in conjunction with cod, mackerel, and shore-fish investigations, 1930*

Date	Station numbers [1]	General locality	Number of stations occupied	Temperature and salinity observations		Collections made					
				Serials, surface to bottom	Surface only	Zoo-plankton surface horizontal	Phyto-plankton surface horizontal	Zoo-plankton oblique	Zoo-plankton serial horizontal [2]	35-foot otter trawl	Welsh trawl
Feb. 5-13	20618-20651	No Mans Land, Mass., to Bodie Island Light, N. C.	34	34	----	1	20	22	----	15	7
Apr. 3-11	20652-20678	Do	27	27	----	10	25	18	----	12	1
Apr. 23-May 1	20679-20715	Cape Cod Bay, Mass., to Bodie Island Light, N. C.	37	36	1	----	36	36	----	15	----
May 12 23	20716-20760	Cape Cod Bay, Mass., to Cape Henry, Va.	45	42	3	34	19	38	1	8	9
June 6-14	20761-20791	Cape Cod Bay, Mass., to Cape May, N. J.	31	31	----	24	1	28	---	6	10
June 17-18	20792-20795	Cape Cod Bay, Mass., and offing of Cape Cod.	4	4	----	3	----	3	1	1	----
June 23-July 1	20796-20831	Cape Cod Bay, Mass., to Cape May, N. J.	36	35	1	35	----	35	1	5	3
July 7-8	20832-20835	Cape Cod Bay, Mass., and offing of Cape Cod.	4	4	----	4	----	4	----	----	----
July 10-14	20836-20853	Nantucket Shoals to Barnegat, N. J.	18	18	----	18	----	18	----	16	1
July 16-18	20854-20858	Cape Cod Bay, Mass., and offing of Cape Cod.	5	5	----	3	----	3	2	2	----
Aug. 1-Sept. 9	20859-20869	Miscellaneous cod tagging trips in Gulf of Maine.	11	3	2	----	----	----	----	9	----
Sept. 15-17	20870-20874	Cape Cod Bay, Mass., and offing of Cape Cod.	5	5	----	----	----	----	5	----	----
Oct. 17-23	20875, 20876	Offing of Cape Cod, Mass	2	1	----	----	----	----	1	1	----
		Total	259	245	7	132	101	205	11	90	31

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[1] Albatross series.

[2] 2 series of hauls, 1 in daylight and 1 at night, were taken at each station. Each series consisted of horizontal tows at 5 or more levels.

From analysis of these data we shall have successive pictures of hydrographic conditions and of the horizontal distribution of plankton during the months of February, April, May, June, and July, the months that probably are most significant in the life history of the principal food fishes of that region.

In addition to the regular plankton collections, which are intended to show only the horizontal distribution, series of hauls have been taken at different levels at 11 stations to determine vertical distribution. The data from these series are expected to facilitate the interpretation of peculiarities in the horizontal distribution and to throw light on the ecology of the plankton community.

Surface drift bottles were released in eight series, a total of 953 bottles. Returns have been so few and their paths so divergent that interpretation of drifts is difficult. It is possible that further light may be cast on the question by additional returns during the coming year.

TABLE 2.—*Record of releases and returns of drift bottles in 1930*

Releases			Returns	
Date	Locality	Number	Number	Remarks
Feb. 6, 12, and 13.	South of Montauk Point, Long Island, N. Y.	249	1	Westerly.
Feb. 7 and 8	Southeast of New York, N. Y.	180	2	1 northeasterly to Long Island, N. Y.; and 1 to Azores.
Apr. 5	Southeast of Cape Henlopen, Del.	114		
Apr. 6	East-southeast of Cape Henry, Va.	54		
May 14	East-southeast of New York	122	11	NE.-SW. on shores of Long Island, N. Y., and New Jersey.
May 16	Southeast of New York	146	2	Northeasterly to Long Island, N. Y., and Marthas Vineyard, Mass.
May 17	Southeast of Atlantic City, N. J.	32		
June 25	South of No Mans Land, Mass.	56	13	9 north and east to Cape Cod, Nantucket, and Marthas Vineyard, Mass.; 4 northwest to Rhode Island and Long Island, N. Y., shores.
Totals		953	29	3 per cent returned.

COD

The initial step in the study of the codfishery has been the determination of the natural divisions of the cod population. An understanding of a fishery obviously requires knowledge as to whether each locality supports a distinct stock or whether the fish of various localities mix freely. The changes in abundance and the effects of fishing must be interpreted differently depending on which of the two conditions exists. The method of wholesale tagging of adult cod has been efficacious not only in determining the movements of the fish but also has provided a wealth of material on life history and kindred subjects.

During 1930 the cod investigations were continued by William C. Schroeder. Marking experiments, which included the tagging of such haddock and pollock as were caught along with the cod, were made in the following localities:

(*a*) Off Mount Desert, Me., April 25–May 2; July 16–23; and October 4–10.

(*b*) In the offshore waters, including Browns Bank, Georges Bank, Cashes Ledge, and Platts Bank, August 2–7, and September 4–9.

(*c*) On Nantucket Shoals, August 18–21, and October 18–22.

TABLE 3.—*A summary of the fish tagged from 1923 to 1930*

BY SPECIES

	1923–1928 [1]	1929	1930	Total
Number of cod tagged	39, 496	1, 169	3, 415	44, 080
Number of pollock tagged	4, 799	13	157	4, 969
Number of haddock tagged	10, 620	134	371	11, 125
Total	54, 915	1, 316	3, 943	60, 174

BY LOCALITIES

	1923–1928 [1]	1929	1930	Total
Browns Bank and vicinity	2, 113		210	2, 323
Georges Bank	2, 002		8	2, 010
New Hampshire and Maine	19, 581		3, 426	23, 007
Massachusetts, north of Cape Cod	645		12	657
Massachusetts, south of Cape Cod	29, 857	848	287	30, 992
New York and New Jersey	717	468		1, 185
Total	54, 915	1, 316	3, 943	60, 174

[1] For more details of the fish tagged from 1923–1928 see Report of the Commissioner for 1928, pp. 631–632.

TABLE 4.—*A summary of the number of cod, pollock, and haddock tagged and recaptured during the years 1923–1930, inclusive*

	Tagged	Recaptured	Per cent
Cod	44, 080	2, 937	6. 8
Pollock	4, 969	104	2. 1
Haddock	11, 125	197	1. 8
Total	60, 174	3, 238	

Much the same results were shown by the recapture records of tagged cod during 1930 as in preceding years. Up to the present time tag returns as high as 35 per cent have been reported for certain lots of cod tagged near shore on grounds often fished; while offshore, on grounds less frequently visited, they have been as low as 1 per cent. While fishing intensity has much to do with this disparity in the numbers of fish recaptured, other things, such as the physical conditions under which the fish were caught at the time of tagging, the security of attachment of the tag, the season of the year, and whether the marked fish belonged to a school that remained localized for some time or was on the point of migrating, have much to do with the percentage subsequently recaught.

Alongshore within the Gulf of Maine to the northward of Cape Cod marking experiments have shown that a good part of the stock of cod present at any given time remains localized for a year or more, that small numbers migrate eastward to Nova Scotia, and that to the northward of Cape Ann only stragglers move southward. These shore waters constitute an important cod nursery for they support a large number of 1, 2, and 3 year old fish.

To the southward of Cape Cod the fall migration of cod from the Nantucket Shoals region into the coastal waters between Rhode Island and North Carolina and the return spring migration northward and eastward has been commented upon from time to time during the past few years. A report dealing with this was published by the bureau during the year.

More information is needed about the cod living on the extensive offshore grounds in the Gulf of Maine before their habits can be determined with any degree of certainty. Results so far have indicated that the Browns Bank cod tend to migrate northward and eastward more than to the southward, that few of them go westward, and that many of the fish may remain on the bank from one year to the next. Some Georges Bank cod migrate to Browns Bank and beyond, across the deep intervening channel, while some move to Nantucket Shoals and the wintering grounds to the westward; but it is probable that the greater part of the vast stock of cod on Georges does not leave the bank.

The capture of large numbers of juvenile cod, about 1 to 2 inches long, on the cod's southern wintering ground to the westward of Rhode Island is noteworthy, as there are no previous records of this sort. These fish were taken between the offing of New York City and the offing of Chesapeake Bay on hydrographic cruises made by the *Albatross II* April 3–12 and April 23–May 1, 1930. Of particular interest was the catch of 360 young, 1 to 2 inches in length, off Little Egg Inlet on April 10, in 12 fathoms, with a 35-foot shrimp trawl having a cod-end lined with bobbinet. Whether these young survive and later migrate eastward, thus replenishing the stock of cod in New England waters, is an important problem for future study. Thus far the indications are either that there is a heavy mortality among these juveniles or that they leave the New York-Virginia waters before summer, for none has been reported there at that season.

Data on the haddock, collected incidentally during the cod investigations from 1923 to 1928, were turned over to Dr. A. W. H. Needler, of the Biological Board of Canada, who made extensive use of them in a report dealing with haddock migrations and populations published during the year.

HADDOCK

The haddock fishery of the western North Atlantic has undergone a tremendous expansion in recent years, with an increase in the landings from approximately 60,000,000 pounds in 1915 to about 190,000,000 pounds in 1930. This expansion largely has been due to the development of the trade in filleted haddock and has been made possible through the growth of the otter-trawl fleet. In 1915 this fleet consisted of 11 steam trawlers; in 1930 it had increased to approximately 130 large and medium sized trawlers, with many smaller vessels.

In 1930 the appropriations for scientific inquiry were increased to provide for a comprehensive investigation of the haddock fishery for the purpose of obtaining an understanding of the biology of the species in relation to the fishery and of ascertaining the effect of the present extensive exploitation on the haddock population. Work began in August, 1930, when William C. Herrington, formerly on the research staff of the International Fisheries Commission, was employed to direct the investigation. He is being assisted by Edward W. Bailey and John R. Webster.

After an extensive preliminary survey of the fishery and literature, the following general lines of procedure were decided upon:

(1) Statistics. (*a*) Determination of the relative changes in abundance of haddock on the different banks from year to year by means of an analysis of present and past boat-catch records. (*b*) Collection of more detailed records for future analysis of abundance and fishing intensity.

(2) Population studies. (*a*) Investigation of the causes of fluctuations in abundance which may appear. This will be done through a study of dominant year-classes and the effects of the fishery on the survival of any year-class. (*b*) Determination of the probable effects of the destruction of undersized haddock, caused by the otter-trawl nets, on the future productivity of the banks and the possibility of partially or entirely eliminating it by changes in the size or shape of the mesh or by other changes in the nets.

(3) Study of migration and its effect on the haddock populations of the various fishing banks by means of marking experiments.

(4) Plankton and hydrographic studies. Determination of the extent to which the haddock grounds are interdependent for their supply of young fish. This will be done by collecting plankton and hydrographic data and by the study of the development and drift of the eggs and larvæ.

Each section of the work outlined is an integral part of the general program, which has for its object an understanding of the changes taking place in the haddock population and the causes of these changes. The ultimate objective toward which this program is directed is the determination of the maximum productivity of the fishery and the means by which it may be maintained.

FLOUNDERS

A limited amount of the increased appropriations for work on North Atlantic fishes is available for a study of the flounder fishery. The principal commercial species is the winter flounder or blackback, *Pseudopleuronectes americanus*, and attention will be given to that species mainly.

During recent years there has been a rapid increase in the exploitation of this resource and doubt has been voiced as to the ability of the species to stand the additional strain imposed by the numerous flounder draggers now operating in the waters off the New England coast. Some are of the opinion that the inshore waters have been depleted and fishermen are being forced to go increasing distances offshore to get their fares. Public appreciation of the seriousness of the situation has been evidenced by the closure by Massachusetts State law, of Cape Cod Bay, to flounder draggers from April 1 to September 30.

The most urgent steps to be taken to arrive at the facts of the situation are the establishment of a more effective system of catch records that will reflect the changes in abundance in various localities; the study of the migrations, in the hope of establishing whether young flounders move out from the inshore grounds to populate the offshore banks; and the discovery of the source of the flounders that concentrate in estuaries and on inshore shoals for the purpose of spawning.

A tag similar to the mark used on the plaice in European tagging experiments has been attached to flounders held in captivity and appears to be well suited to the purpose. Arrangements have been made for the manufacture of a sufficient supply for an extensive field trial to be undertaken early in 1931.

MACKEREL

Investigations of the mackerel fishery during 1930 may be considered in two parts: (1) Observations of the commercial fishery; (2) observations on the success of spawning and survival of the young larvæ.

As in previous years the data on the commercial fishery collected at the principal landing ports have been studied from the point of view of the relative abundance of the mackerel on the various fishing grounds, as compared with previous years, and the relative numerical importance of the several year classes in the mackerel population. The work continued under the supervision of O. E. Sette. Field observations were made by Frank E. Firth at New York in May and June, and at Boston from June to December; by Robert A. Goffin at Cape May, N. J., during April; by William C. Neville at Newport during May; and by various field assistants engaged primarily in the collection of data on the pound-net fisheries of the Middle Atlantic region throughout the fishing season.

Altogether, information was secured as to date, locality, and quantity of 1,863 out of the total of 3,175 fares landed by the offshore fleet. Samples from about 1,500 fares were measured. These, together with 5,652 mackerel measured by pound-net observers, make a total of over 40,715 length measurements for the season. Scale samples were taken from 930 mackerel. A considerable number of vessel captains have continued to cooperate by the keeping of detailed log-book records of their fishing activities.

A final analysis has not been completed, but according to preliminary studies of the data, it appears that 3-year classes were the chief contributors to the commercial catch of 1930. The class of 1923 (including a small percentage of older fish) furnished about 25,000,000 pounds; the class of 1928 furnished 12,000,000 pounds; and the class of 1929 furnished 6,500,000 pounds out of the total catch of 43,500,000 pounds.

The brood of 1923 has now been in the fishery for six years, and during this time it has made up the bulk of the yield. Its diminution in numerical strength has been very gradual. The approximate number of mackerel of this brood in the purse-seine catch in each successive year beginning with 1925, was 19, 24, 20, 14, 11, and 10 millions, respectively. This does not necessarily mean that the relative abundance was exactly as indicated by the above figures for the fishing effort has not been exactly equal during this period; but we believe that they do express the abundance in an approximate fashion, and indicate that mortality rate is very low once a brood has passed its second year.

Broods which should have been produced in the years 1924 to 1927 have been practically nonexistent. To be sure, the 1927 brood furnished over a million pounds in 1928 and somewhat less in 1929; but in the main, these year classes failed to produce enough survivors of commercial size to be significant in the catch.

The 1928 class furnished 22,000,000 pounds of mackerel in 1929 and 12,000,000 pounds in 1930. A year ago it appeared that the 1928 class was numerically superior to the 1923 class for it furnished nearly five times as much fish in its second year as did the 1923 class when it was of the same age. But the smaller catch of this brood in 1930 calls for a more modest estimate of its size; unless fish of this brood reappear in unexpectedly large numbers in the future. At any rate, it is the most important contingent that has joined the stock since 1923.

It is too early to judge the importance of the 1929 class. The 6,000,000 pounds caught in 1930 indicate the advent of a brood of some importance but the quantity of mackerel caught in the second year of life seems not to be a very good index of their numerical abundance, and judgment must await next year's fishery.

It is obvious from the above observations that the production of a numerically rich year class is an occurrence that takes place only at intervals of several years; but when a large brood is once established, it is a dominant feature of the fishery through at least six years, perhaps more.

An understanding of the conditions which in one year may produce a rich class and in another may cause virtually complete mortality of the current brood is important, both to the understanding of the fishery as a resource to be conserved and for the practical purpose of making more accurate predictions of the abundance of mackerel. For this purpose the *Albatross II* made six cruises to the mackerel spawning grounds during the period from April 3 to July 18. Data were collected to afford a roughly quantitative estimate of the natural production of mackerel eggs and of the survival of the larvæ, together with such observations on the temperature, salinity, and plankton constituents as might be expected to furnish a clue to the factors controlling the success or nonsuccess of the year class.

Later in the season, several short cruises to the mackerel grounds in the offing of Cape Cod were devoted primarily to the collection of data on the vertical distribution of plankton and its possible effect on the availability of mackerel to the commercial fishery.

In accordance with the bureau's policy of making results of its work available to the public as soon as possible, the information on the year class composition of the catch during 1929 was summarized and its implications as to the effect on the fishery during the ensuing season was outlined in articles submitted to fishery trade journals for publication. The weight of evidence indicated a level of abundance that was likely to furnish a catch of about 60,000,000 pounds, provided the intensity of fishing remained practically the same. The total actually realized was 43,500,000 pounds or 27 per cent less than the predicted amount. The discrepancy consisted almost entirely of failure of the 1928 brood to reappear in the abundance indicated by the unusually large catch (for fish of its age) in the previous year.

This emphasizes the need for a more accurate method of determining the abundance of a brood while it is still at an early age. The survey of survival of larvæ on spawning grounds provided by the oceanographic work of the *Albatross II* may help to fill this need, as data on more seasons accumulate.

NEW ENGLAND SMELT

Since the publication of The Smelts (Bureau of Fisheries Document No. 1015) in 1927, Dr. W. C. Kendall has been intermittently engaged in a study of various problems pertaining to those fish. Early in the summer of 1929 he was detailed to accompany MacMillan on an expedition to Baffin Land, which again interrupted the work on the smelts. Following his return from the north, unavoidable circumstances prevented resumption of the study except for occasional brief periods of work on the manuscript which has now reached its final stage. The manuscript comprises three major sections: (1) History of the classification of the smelts and an analytical discussion of the different nominal species and their variants of the genus *Osmerus;* (2) analysis of the data pertaining to the relationship of the smelts of eastern North America; (3) life histories of the smelts based on scale reading and sizes of the fish.

TROUT AND CHARRS

Another study, begun years ago by Doctor Kendall and continued interruptedly to the present time, pertains to the charrs of which the so-called eastern brook trout is the best known example. One problem connected with the latter species is that of the relationship of the " salter " or " sea-run " trout to the brook trout. While a difference of habit has been noted, no difference of structure has been discerned.

The " salter " is a *fontinalis* type of trout in which the habit of passing a considerable part of the year in salt water has become fixed. In spring or early summer it appears in tidal creeks and fresh water sections thereof apparently in pursuit of food. In certain streams of Maine where they are now far from as abundant as they used to be, their appearance has been observed to be concurrent with the appearance of the translucent stage of young eels, known as " elvers," with which they have often been found to be gorged.

This " sea-run " habit is more pronounced or at least more conspicuous, perhaps from great abundance of fish, in Canadian and Newfoundland waters. It would almost seem that the habit is a hereditary trait not shared in by all of the species, and that the salters may be regarded as a " physiological race."

ATLANTIC AND LANDLOCKED SALMON

Another piece of work, by Doctor Kendall, like that pertaining to the smelts, has suffered from protracted interruptions. The work referred to is the preparation of a " Memoir " on the Atlantic and landlocked salmons to be published as Part II of the Salmonidæ of New England, by the Boston Society of Natural History. Part I comprised the trouts or charrs of New England, published in 1914. During the year the section of Part II pertaining to the Atlantic salmon was completed and has been submitted to the Boston Society and the section pertaining to landlocked salmon is soon to follow.

The topics covered by the "Memoir" comprise about every phase of the natural history of the salmons, with a history of New England salmon rivers and original landlocked salmon lakes. The natural distribution of the fish in North America is restricted to a comparatively few localities comprised in a wide area. While it has received much fish-cultural attention, its fish-cultural distribution has been ill-considered and its "conservation" recklessly administered. The author discusses to some length the subject of restoring of natural salmon lakes that have apparently deteriorated in quantity, quality, and size of fish. A reduction in quantity is usually easily accounted for. While the causes of deterioration in quality or size of the fish may be somewhat more obscure, there are usually associated conditions which indicate the probable causes. However, the author regards the popular idea, that such deterioration is due to inbreeding, as an absurd fallacy. Also that the introduction of "new blood" in the form of a smaller race of salmon or of "Canadian sea salmon" is equally fallacious.

SHORE FISHERIES OF THE MIDDLE ATLANTIC STATES

The statistical canvass of 1926 showed that yields of several of the more important shore fisheries were below normal in New York and New Jersey. An investigation of the causes of this decline was begun in 1927 and has been continued under the direction of R. A. Nesbit.

In order to understand what changes in yield have occurred, published statistics were studied and special records were collected directly from fishermen. The latter consisted of information transcribed from business records of pound-net operators, lent for the purpose, and since 1928, of information recorded daily on forms provided by the bureau. These records have proved of great value, and the cooperation of the 26 operators who kept these records is gratefully acknowledged.

Study of the causes of the changes in abundance occurring during the course of the investigation was continued during 1930. For this purpose, biological observations were made during part or all of the 1930 fishing season at each of the following field bases: Woods Hole, Mass.; Newport, R. I.; Montauk and Fire Island, N. Y.; Belford, Long Branch, Deal, Seaside Park, Beach Haven, and Wildwood, N. J.; and Hampton and Cape Charles, Va. In the course of these observations more than 100,000 fish were measured and 11,000 scale samples from squeteague were collected.

Chief progress has been made in analysis of the data relating to squeteague and scup. Studies of the scales and length frequencies of the former have provided a technique for age analysis of the commercial catch. These studies have further demonstrated distinct differences in rate of growth in several localities, the rate increasing from Chesapeake Bay northward. A remarkable feature of these observations of age composition of the catch is the virtually complete absence of yearling squeteague in all three seasons, although fish a year younger and a year older are present. Not only are yearlings absent from the commercial catch, but they also are absent from the catches made by experimental trawls, seines, and hand lines in the bays where juveniles in their first summer are readily taken.

Study of published and specially collected statistics of yield indicate that fluctuations in central and southern New Jersey have been moderate and that squeteague are little, if any, less abundant than during the early years of the fishery. In New York and northern New Jersey, however, remarkable fluctuations, similar to those recorded from southern New England, were noted. In these localities, a spectacular increase in yield occurred in 1902. The increase persisted through 1908, but since that year the catch has fluctuated moderately about a level even lower than that which obtained before the increase.

It was expected that discovery of the causes of the minor fluctuation in recent years would cast light on the probable causes of larger changes in the past. This expectation has not been realized, for it appears that fluctuations during the course of the investigations are due largely to marked variation in the numbers of 2-year-old squeteague entering the fishery for the first time. Thus the general increase in yield of squeteague in New York in 1929 over that of 1928 was due almost entirely to the appearance of large numbers of squeteague of the 1927 year class. This year class continued to dominate the catch in 1930.

Seasonal distribution of the large catches between 1902 and 1908 was so markedly different from that of recent years as to suggest that quite different causes were concerned. Virtually all of the 2-year-old fish have appeared in the spring during the three years of scientific observation, while the few large fish taken have appeared during the summer and autumn. During the period of very large catches, the bulk of the catch was taken in the summer and autumn, the spring catches being actually less than those of recent years. This suggests that the large catches between 1902 and 1908 consisted of large fish and that their appearance was not heralded by unusually large catches of 2-year-old squeteague a few years prior to the period of abundance. This suggestion is confirmed by the testimony of living witnesses.

These facts suggest the hypothesis that migration, either from other coastal waters, or from an offshore reserve, is an important cause of such remarkable increases in abundance as those which occurred in New York and southern New England 30 years ago. Otherwise, it is scarcely credible that such extraordinary numbers of large fish, described as averaging from 3 to 5 pounds in weight, could have appeared without giving notice of their existence by marked increases in spring catches during the years immediately preceding their appearance as large summer fish.

The principal objective of further investigation will be the testing of the two hypotheses offered in explanation of these peculiarities of behavior on the part of the squeteague. These hypotheses are: (1) Stocks of squeteague north of Delaware represent one or more self-perpetuating units of population, in which successful local reproduction accounts for the annual increment to the stock; (2) local reproduction accounts for little or none of the increment to the stock of squeteague north of Delaware, the whole stock being maintained by migration of fish 2 years or more of age from southern waters.

The first of these hypotheses is supported by the fact that squeteague are known to spawn in Delaware Bay, and by the fact that juveniles occur in Delaware Bay, Sandy Hook Bay, Great South Bay, Fort Pond Bay, Narragansett Bay, and in the Wareham River at the head of Buzzards Bay. Moreover, the existence of local races is indicated by differences in rate of growth in several localities. If this hypothesis be correct, the absence of fish in their second summer must be explained. It is possible that they remain concealed locally or that they spend this period in southern waters or offshore.

Absence of fish in their second summer is consistent with the second hypothesis, for fish of this age are abundant in southern waters. In order to account for the differences in rate of growth of northern and southern fish, it is necessary to assume that migration is a selective process. This hypothesis is also in agreement with the facts disclosed by an investigation of spawning and nursery grounds in Delaware Bay. Results of this investigation may be summarized as follows:[2]

A very intensive spawning of squeteague occurs in May and early June off the west shore of Cape May, from about 1 mile to 3 or 4 miles north of Cape May Point, mainly along the 3–4 fathom contour. Single 20-minute meter-net hauls have yielded more than half a million squeteague eggs in this locality during the height of the spawning. Squeteague taken here by gill nets during this period were spawning freely. Although squeteague eggs were taken elsewhere in the bay, the quantities were small.

Intensive observations, however, failed to produce any evidence that these eggs hatched or that larvæ from them survived. Meter-net collections were taken at all depths from the surface to the bottom and as far away in all directions from the spawning area as the cruising range of the boat permitted. Only negligible numbers of larvæ, usually one or two specimens, were taken in the same nets which collected half a million eggs.

Later in the summer, in both years, young squeteague appeared in the bay and remained fairly abundant during the summer. The sizes of these juveniles were such that they can not be attributed to the spawning described above. They did not consist of a compact size group as would have been the case had they resulted from the brief and localized spawning described above, and other facts indicate that very small juveniles continued to be added to the stock in the bay long after cessation of intensive spawning there. As the majority of the young fish taken in the fall were much smaller than normal, there are grounds for believing that many of them may fail to survive.

These conditions contrast with those observed by John C. Pearson, who conducted a similar survey in Chesapeake Bay during 1929 and

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[2] Summarized from a report by Prof. A. E. Parr, curator of the Bingham Oceanographic Foundation of Yale University, who has been in charge of the Delaware Bay survey.

1930. In that locality larvæ as well as eggs were found in both years, and length measurements indicated that juveniles grew regularly and attained, by the end of the season, a length commensurate with that of yearlings appearing in commercial catches in the spring.

Two years' observations in but one of the several northern localities frequented by juveniles are insufficient to prove that reproduction is always a failure, either in Delaware Bay or elsewhere. They do, however, indicate the need for continuation of observations in Delaware Bay and their extensions to other localities.

The most direct method of testing these hypotheses is a study of migrations and of the survival of marked juveniles. Unfortunately, squeteague are difficult to mark. Two field experiments in the tagging of this fish have failed to produce satisfactory returns. Although all external tags have so far failed in both laboratory and field experiments, the Woods Hole experiments have demonstrated that young squeteague will carry small strips of celluloid in the body cavity without injury. This mark is inconspicuous and will not be observed until the fish are cleaned. On the other hand, it may be applied to very small fish and probably will be retained indefinitely by the majority marked.

W. C. Neville has analyzed scup data collected in the course of the investigation, and he finds that this species has been subject to considerable fluctuation in yield during the past 40 years. The yield in New Jersey in 1926 was, save for 1908, the lowest of any year in which statistical canvasses were carried out. A remarkable recovery occurred in 1929; the pound-net catch arose to the highest total ever recorded and continued to be high in 1930. This phenomenon is seen to be the result of a high survival from the spawning of 1927. Scup of this year class appeared in large numbers in northern New Jersey in 1928; but as they were too small to be marketable, they had no effect on the reported yield. In 1929 and 1930 they were salable, and consequently the catch increased greatly. It is notable that the 1927 brood spawned in a year when the reserve of spawning adults was at a very low ebb, indicating that success of reproduction is independent of the spawning reserve within wide limits.

The yield of butterfish, although subject to considerable fluctuation, has been satisfactory in recent years. Age determination has proven difficult, as the scales are illegible and length frequencies difficult to interpret. The studies of H. M. Bearse, who has analyzed length-frequency data, indicate that dominance of the fishery by occasional large broods is largely responsible for the fluctuations which occur.

Spot, or Lafayette, is not ordinarily of much importance in New York and New Jersey. In 1926, however, the yield in New Jersey reached 1,217,000 pounds, and in New York 436,000 pounds. The observation of C. M. Breder, jr., of the New York Aquarium, to the effect that young spot, too small to market, were unusually abundant in New York Harbor in 1925 supports the view that the large yield in 1926 was due to an unusually large brood and that the spot may be added to the long list of species known to be subject to natural fluctuations caused by variation from year to year in success of reproduction.

CHESAPEAKE BAY INVESTIGATIONS

During the past year John C. Pearson has conducted for the bureau several investigations in the Chesapeake Bay region. A study of the seasonal distribution of pelagic marine fish eggs and young fishes at the mouth of the bay was begun in 1929 and continued throughout 1930, when field work was completed. The results of this study showed the annual occurrence of at least 40 species of pelagic young marine fish and also located the spawning grounds of the squeteague or gray sea trout. A report of this investigation is in course of preparation.

A recent important development is the winter trawl fishery off the Virginia and North Carolina coasts. This fishery has now grown to considerable proportions and is conducted from November to early spring by local and northern fishermen. An observer has been stationed at the leading Chesapeake trawling port to obtain records of the composition of the catch, the locations of the fishing grounds, and other data, and a report will be issued after the first season's observations.

Certain angles of one of the country's leading recreations were described by Mr. Pearson during the past year when a survey of sport fishing possibilities in Chesapeake Bay was completed. A concise description of angling, the localities and facilities for sport fishing, and the leading food and game fishes of the region has furnished material for a paper entitled "Sport fishing in Chesapeake Bay."

INDEPENDENT ACTIVITIES AT THE FISHERIES BIOLOGICAL LABORATORY, WOODS HOLE, MASS.

The Woods Hole laboratory under the direction of O. E. Sette has continued to afford facilities for the experimental phases of research on commercial fisheries problems. These facilities have been of particular value in the rearing of juvenile squeteague, scup, and sea bass in aquaria under known temperature and food consumption. These observations have verified the conclusions as to the growth rate of wild stock, have indicated the probable temperature of their winter habitat, and have paved the way for further experiments on effects of environment.

Of equal importance have been the observations on fish marked with various styles of tags. The marking of fish to determine their migrations, the intensity of fishing, etc., is one of the most important phases of fisheries research. Its greater use has been prevented through lack of suitably designed tags. Through the laboratory experiments, causes of failure have been observed and corrected. A type of tag suitable for flounders, scup, and sea bass has been developed; and experiments continue on cod, haddock, and squeteague. This tag consists of an improvement of the Scottish plaice label, used so successfully in European waters. The improvements consist of substitution of pure nickel for silver wire, the addition of printed return instructions and of reduction in thickness and diameter of the disks. The value of these improvements is well established by laboratory experiments.

During the summer months the bureau's activities in plankton studies, observations of spawning of fishes, larval development and growth of juvenile fishes in the vicinity of Woods Hole were centered at the laboratory. This work is seriously handicapped through lack of a boat capable of operating an otter trawl of sufficient size to catch fishes for experimental work. Provision of new floating equipment at the laboratory is a matter of utmost urgency if research work is to continue.

In accordance with the bureau's long-established policy of encouraging independent research in marine biology and related subjects, the facilities of the laboratories at Woods Hole, Mass., were made available to a number of investigators from various educational institutions. Personnel so accommodated at Woods Hole included: Dr. Robert Payne Bigelow, Massachusetts Institute of Technology, stomatopoda of the *Albatros* eastern Pacific expedition; Leon C. Chesley, Duke University, enzymes of fishes; Dr. N. A. Cobb, Department of Agriculture, nematodes; Paul S. Conger, U. S. National Museum, diatom investigations; William L. Doyle, Johns Hopkins University, pituitary of *Mustelis canis* and *Lophius piscatorius*; Kendal W. Foster, Harvard University, the blue phase in coloration of Fundulus; Dr. I. E. Gray, Duke University, respiration of fishes; Dr. F. G. Hall, Duke University, respiration studies on marine fishes; Dr. John C. Hemmeter, Johns Hopkins University, Langerhans organ of Lophius; Dr. Edwin Linton, University of Pennsylvania, trematodes of fishes; Raymond W. Root, Duke University, respiratory function of the blood of marine fishes; Wellford Taylor, Princeton University, Crepidula eggs and pituitary of rats and cats; Gerald Thorne, Department of Agriculture, nematodes; Sam R. Tipton, Duke University, respiration of fishes; Leonard G. Worley, Harvard University, cilia of marine and fresh-water animals.

SOUTH ATLANTIC AND GULF FISHERY INVESTIGATIONS

SHORE FISHES OF NORTH CAROLINA

The investigation relative to the development of fish eggs and young fish undertaken several years ago was continued throughout the year by Dr. Samuel F. Hildebrand, assisted by Louella E. Cable. A special effort was made to secure missing larval stages of several species and to collect sufficient samples for determining the rate of growth of several commercial species by making large series of length measurements at frequent intervals. Pronounced progress was made in both lines of endeavor.

The study of the large collection of young fish that has been accumulated from collections made locally and secured from elsewhere was pursued energetically. A report on the subject was completed during the year. Preparation of drawings and descriptions on the development of other species was continued and fairly complete data for several forms, not included in the recently published paper, are at hand.

Miss Cable has undertaken, also, a critical study of the life history of the pigfish (*Orthopristis chrysopterus*). For the determination of the growth, age, and span of life she is making use of otoliths and scale characters in addition to length measurements.

TERRAPIN CULTURE

Experiments in diamond-back terrapin culture, carried on at the biological station at Beaufort, N. C., under the direction of Dr. Samuel F. Hildebrand, progressed very satisfactorily.

Egg production from the entire brood stock was high and a fair rate of fertility prevailed. The hatch for the season of 1930 consisted of 7,054 young. The entire hatch of the season was placed in the brooder house and a large series of experiments pertaining to feeding and other treatment is being conducted.

Experiments with the 1929 brood again showed that salt water is a better medium for the young in the brooder house than fresh water, for the death rate was considerably lower and the growth rate slightly higher among the animals kept in salt water than those in fresh water, although the last-mentioned difference may have been due to the greater loss in fresh water among the smaller and weaker animals. Among the various foods and combinations of foods used, a mixture of fresh fish and oysters gave the best results when rate of survival and growth are both taken into consideration. Liver, beef, and vegetables did not give satisfactory results.

No epidemics occurred among the young animals, although "sores," a disease of unknown origin and for which no cure has been found, again were present. Among 7,782 young of the 1929 brood placed in the brooder house, 3.4 per cent died of this cause. "Soft-shell," a condition correlated with a failure to feed and resulting in a generally emaciated condition, caused 10.7 per cent of deaths, and all other causes resulted in 3.6 per cent of deaths. The total number of deaths, prior to liberation of the brood of 1929, or during about the first 8 or 9 months of life, therefore, was 17.9 per cent, which is regarded as a rather low death rate.

The surviving animals, exclusive of 200, which were retained for further experimentation, were turned over to the North Carolina Department of Conservation and Development for liberation in suitable areas. The animals had attained a length on the median line of the plastron of about 1⅓ inches (32.4 millimeters) which represents a growth of slightly more than ¼ inch (5.4 millimeters) since hatching. Many of the animals, however, were 1½ inches and over in length, the average being reduced by numerous "runts" which always have been present during the course of this work. The average rate of growth shown is not the best obtainable with our present state of knowledge, because certain foods used, although showing unsatisfactory results, were continued throughout the season in order to emphasize the results.

Practical results from the liberation of young terrapins are becoming more and more evident in the commercial catches from the frequent occurrence of terrapins which bear the marks made at the laboratory on a marginal plate upon liberation.

BAY SCALLOP

At Beaufort, N. C., Dr. J. S. Gutsell has been conducting investigations as to the commercially important bay scallop, which nationally is about equal to the soft clam in commercial value. The facts learned offer a basis for wise conservation or for active development through scallop culture.

Two reports based on these investigations have been prepared. One appeared in 1928, and the other, The Natural History of the Bay Scallop, went to press in 1930.

POLLUTION OF STREAMS IN WESTERN NORTH CAROLINA

At the request of the Department of Conservation and Development of North Carolina, Dr. J. S. Gutsell in 1930 undertook an investigation of the effect of wastes from factories at Sylva, N. C., upon the fish of the Tuckaseegee River. The factories located at Sylva consist of a tannery; a plant for the manufacture of commercial tannery extract; and a plant for the manufacture, by means of the semichemical pulping process, of paper board. The wastes are discharged into Scotts Creek about 2 miles from its entrance into the Tuckaseegee River. Most of the complaint for destroying bass fishing is against the paper-board waste which blackens the river to its mouth some 35 miles below.

Experiments were made with fish in various dilutions of the wastes from the different plants. Fish were also placed in wire cages in Scotts Creek and the Tuckaseegee River above pollution and for as much as 19 miles below, and a study of the fish and bottom fauna above and below the point of entrance of pollution was made. The paper-board waste had no definite lethal effect in 10 per cent concentration upon the fish in diluted wastes. The discharge from the extract plant ordinarily was almost without effect even in high concentration and with its small volume is not an important factor. The tannery waste was lethal to trout down to 5 per cent concentration. However, this is a much higher concentration than occurred in the Tuckaseegee River at its lowest stage during August or September, 1930. Cage experiments revealed no definite lethal action of the pollution of the Tuckaseegee River on trout or bass. In general, fish were found as abundant in the polluted section as above it, although suckers and darters were scarce in the river from Scotts Creek 20 miles downstream or as far as the river was examined for fish.

Aside from appearances the greatest discovered effect of the pollution was on the bottom fauna. In particular stone flies and May flies were scarce in the polluted section. The effect on the bottom fauna is attributable to the deposition of organic matter from the paper-board waste.

There are complaints that harmful substances occasionally are discharged by the plants at Sylva in much greater amounts than ordinarily and that many fish are killed thereby. Although this was not disproved, no direct evidence of it was found and no definite report obtained of such an occurrence in recent years.

The investigation revealed no evidence that the wastes from any of the Sylva plants is directly injurious to fish in the Tuckaseegee River. Most fish, including bass, were found as numerous below the entrance of pollution as above it. The only locally esteemed fish which must be excepted is the red horse sucker. However, the deposition of the organic matter from the paper-board waste adversely affects the bottom fauna and so stands in the way of full possible improvement, as from stocking. This same waste, by its discoloration of the water, makes angling unattractive and discourages stocking. There is also the possibility that this discoloration prevents the upward migration of bass from the Little Tennessee River, into which the Tuckaseegee River discharges, and so is responsible for the reported loss, coincident with the discoloration of the stream, of the bass fishing from above Bryson to the mouth of the Tuckaseegee River.

At Old Fort, N. C., on the Catawba River, in close association are a tannery and a plant for the manufacture of tannery extract. Doctor Gutsell made a brief investigation of the effects of pollution from this source.

The Catawba River proved to be so polluted for over 2 miles that heavy sludge deposits occurred in the stream and along the margins. The bottom fauna was remarkably altered. For about a mile below the combined outfall no fish were found and at about 2 miles the stream was poor in species and individual fish. At about 4 miles conditions had much improved. The bottom fauna was more nearly normal and fish life more abundant and varied. At a point about 8 miles below the factory outfall the bottom fauna proved to be much like that above the point of pollution, indicating that recovery, at least in rapid portions of the stream, was substantially complete.

Reports on the Tuckaseegee River and the Catawba River investigations were submitted early in December to the North Carolina Department of Conservation and Development.

During the investigation of stream pollution a considerable collection of fishes was made and turned over to Dr. Samuel F. Hildebrand for identification. Quite a number of forms proved very puzzling and the study of the collections showed clearly that the fishes from the western part of North Carolina are still quite imperfectly known and inadequately described.

SHRIMP

The shrimp fishery which is prosecuted on a commercial scale from Beaufort, N. C., to Corpus Christi, Tex., produced 113,000,000 pounds of fishery products in 1929 and ranks fifth in value and sixth in volume among all the fisheries of the country. This yield is two and one-half times the quantity produced in 1918, and this rapidity of expansion has caused great anxiety for the future of the industry. Lacking adequate funds and personnel, the bureau formerly was unable to satisfy the many requests for information or advice on questions of regulation of the fishery. Although of commercial importance for half a century, no adequate study of the shrimp had ever been made. The passage of the 5-year program bill, however, made it possible for the bureau to accede to these requests for an investigation, and plans were laid early in the fiscal year 1931 to start an adequate program of study which would require several years for its completion, and to attack all phases of the shrimp problem at a number of points representing the entire range of the fishery.

Dr. Frank W. Weymouth, professor of physiology at Stanford University, who has wide experience in fishery research, was selected to supervise this investigation, and, although he will not begin active duty until early in 1931, a staff of assistants was organized to begin preliminary observations. Dr. James S. Gutsell started studies on the development and early life history of the shrimp at Beaufort, N. C., and W. W. Anderson was stationed at Brunswick, Ga., to observe the fishery.

An important feature of the present plans is extensive State cooperation. The States to whom these resources belong, even though they may have no research division, often have valuable local facilities which, coordinated and supplemented by bureau aid, can obtain valuable results. A cordial spirit of cooperation has been shown by the majority of the States; active participation in the program has been undertaken by Georgia and Louisiana, and negotiations looking toward a similar action are under way in Texas.

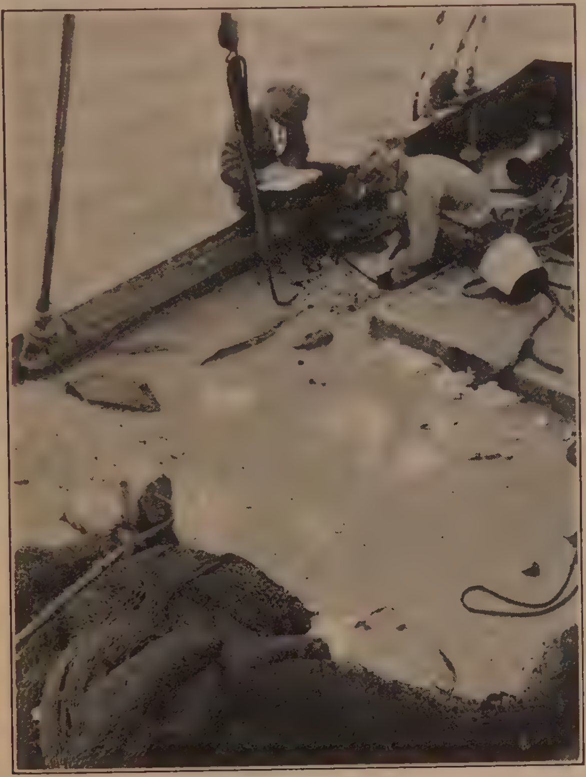

FIGURE 3.—Experimental fishing for shrimp in Georgia. A sample of the shrimp catch is measured for records of growth and fishes taken are sorted according to species and recorded

Last September Commissioner Peter S. Twitty, of Georgia, took the initiative in a biological investigation of Georgia's fisheries by hiring an investigator and two boatmen. Since that time they have been operating an experimental shrimp trawling vessel furnished by the bureau along the entire coast of Georgia and the northern coast of Florida, and valuable data on the effect of shrimp fishing upon other economic species have been accumulated. A survey is being made of the shrimp fishery and detailed studies are being conducted on the growth, migrations, and habits of the shrimp, as well as the degree of injury to food and game fishes resulting from the destruction of immature fish by the shrimp trawlers in sounds and rivers.

In Louisiana a carefully drafted statute approved July 11, 1930, required the commissioner of conservation to create a bureau of statistical and biological research and appropriated the sum of $50,000 to finance the compilation and study of scientific data concerning the State's natural resources. Commissioner Robert S. Maestri has given effect to this statute by setting aside a budget sufficient for an immediate investigation of the shrimp, and plans are being completed for a joint investigation with the U. S. Bureau of Fisheries.

ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORY, BEAUFORT, N. C.

The work of the Beaufort (N. C.) biological station is mentioned in the sections of this report dealing with the investigations by the bureau's staff of shore fishes, diamond-back terrapin culture, shellfish investigations, and stream-pollution studies. The facilities of the station were made available to several independent investigators. Prof. H. V. Wilson, of the University of North Carolina, engaged in the study of the embryology of sponges. Mrs. Henry R. Fuller, graduate student of the University of North Carolina, studied the embryology and local distribution of certain annelids and sea urchins. Miss Ezda Deviney, of the Florida State College for Women, experimented with the regeneration of several species of ascidians from cuttings of the adult animals. Dr. Hoyt S. Hopkins, of the New York University, continued his studies of previous years concerning the rate of growth of the hard clam (*Venus mercenaria*) and also the respiration of this mollusk and other bivalves of the vicinity. Dr. W. C. George, of the University of North Carolina, continued his observations of previous summers on ascidian blood and prepared a manuscript on this investigation. Prof. C. M. Child, of the University of Chicago, performed some experiments during the winter months on the physiological polarity and on the scale of organization on Tubularia and some other hydroids, and in sponges after the dissociation of cells. Dr. L. G. Barth, National Research Fellow, also working during the winter months, measured the electrical potential differences of reconstituting pieces of the hydroid, Tubularia. Prof. Z. P. Metcalf, of North Carolina State College of Agriculture and Engineering, made some observations on the ecological relationship of the animals inhabiting the sand dunes and flats of Bogue and Shackleford banks. Dr. Bert Cunningham, of Duke University, studied the relationship of temperature to the rate of growth of diamond-back terrapin embryos, and he also secured some eggs with embryos for future study.

The facilities of the station were also utilized by investigators of the U. S. Chemical Warfare Service and of the U. S. Coast Guard for testing samples of wood treated against marine borers.

ICHTHYOLOGICAL STUDIES

Over a period of a couple of years Dr. Anatasio Alfaro of the National Museum of Costa Rica submitted small collections of fishes from that country for identification. The determinations were made by Doctor Hildebrand, and the collections contained a few species which were new to the fauna of Costa Rica. In other instances the range of distribution was extended within that country, and, furthermore, the study revealed some noteworthy facts which were published in Copeia in 1930.

The systematic study of the Texas fishes mentioned in previous reports has been expanded by Isaac Ginsburg to include the entire Gulf coast of the United States. This fish fauna forms a complex whole in which it is first of all necessary to clearly distinguish between the species in order to understand their complex interrelationship and the mutual influence which one species exerts on another.

With this object in view Mr. Ginsburg spent part of the summer season on the Gulf coast collecting and making observations on the coasts of Louisiana, Alabama, and Florida. Most of the work was done at Grand Isle, La., where quarters and cooperation were offered by the Louisiana State University. A good series of the various species obtainable at that time of the year was preserved for study. A study of this material has shown that important corrections will have to be made in our present-day ideas regarding the status of quite a number of the species and their relation to fishes of adjacent regions. It is intended to publish a series of shorter papers clearing up such moot points while the general project is in progress. A paper on a common species of goby based on these studies has already been prepared and submitted, and other papers of a similar nature are in preparation.

GREAT LAKES FISHERY INVESTIGATIONS

In 1930 the Great Lakes investigations under the direction of Dr. John Van Oosten were conducted on Lake Erie, Green Bay, Lake Michigan, Saginaw Bay in Lake Huron, and on Lake Champlain. The investigations conducted on Lakes Michigan and Champlain were new enterprises started in 1930, while those on Lake Erie and on Saginaw Bay were continuations from previous years.

LAKE CHAMPLAIN

The Lake Champlain investigation was a joint undertaking with the Dominion Government of Canada and was conducted under the auspices of an International Fact-finding Commission composed of James A. Rodd, representing Canada, and Dr. John Van Oosten, representing the United States. Six investigators took part in the field work which covered a period of about four months. The chief objective of this investigation was the accumulation of scientific data pertinent to the question of determining the effect of commercial seining by Canadian residents in Missisquoi Bay on the abundance of the pike perch in the United States waters of Lake Champlain. This question involved a study of the chief features of the biology of the yellow pike perch, yellow perch, smelt, and suckers. In addition to determinations of abundance, length, weight, sex, and maturity, large numbers of stomachs were collected and more than 8,000 yellow pike perch were tagged to determine the extent of its migration in Lake Champlain.

LAKE MICHIGAN AND GREEN BAY

The Lake Michigan and Green Bay investigations were also cooperative undertakings, the work being liberally supported financially by the Conservation Departments of Michigan and Wisconsin and by a group of four fish net and twine companies located in the Great Lakes area. The twine companies donated some 90,000 feet of experimental gill netting valued at about $3,200. The Lake Michigan program was designed primarily to determine whether it is possible to fish gill nets for chubs, species closely allied with the whitefish, without destroying large numbers of small, immature lake trout as actually occurs at the present time. This problem in its broader aspects is a complicated one and involves not only a study of the selectivity of gill nets of various-sized meshes on lake trout and chubs at various seasons and in various areas, but also a consideration of the following questions: Effect of various methods of stringing chub nets on the catch of lake trout, distribution and migration of chubs and lake trout at various seasons and in various areas of the lake and the factors involved therein (currents, depths, temperature, bottom, plankton, food, etc.), races or species of lake trout, the effect of bait nets on the food supply of lake trout and on the abundance of chubs, the destructiveness to immature lake trout and whitefish of hooks, large-meshed gill nets, pound nets, and deep trap nets. In addition, as many data as possible were collected on the natural history and life history of the various species of coregonoids and lake trout.

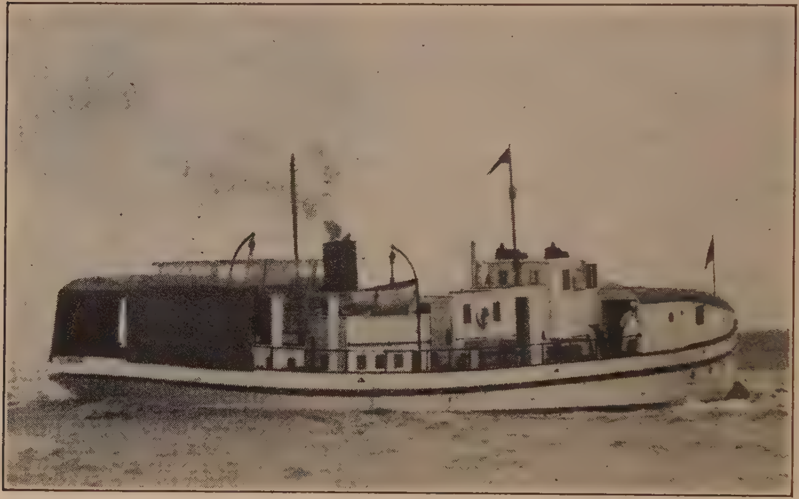

FIGURE 4.—The U. S. F. S. *Fulmar* equipped for experimental gill-net fishing in Lake Michigan. A unique feature of this equipment is the drying reels for nets. They permit the vessel to fish from a different part each day without returning to dry nets

The bureau's vessel, *Fulmar*, a boat 102 feet long, has been fully equipped for experimental fishing and has been manned by experienced commercial fishermen, in addition to the scientific personnel. The Lake Michigan investigations were begun June 17 and discontinued November 19, 1930. The program was interrupted from August 22 to September 20 due to the installation of a new main engine, and the cleaning and repairing of the boat.

Before resuming operations on Lake Michigan, a short survey was made of the herring fisheries in Green Bay at the special request of the Conservation Commission of the State of Wisconsin. This work, carried on from September 20 to October 4, was designed to determine by experimental fishing whether a shifting of the line of demarcation between bay fishing and lake fishing in Wisconsin waters would be detrimental to lake trout and chubs. This line, as defined by law, now extends from the mouth of the Menominee River in Marinette County to Limekiln Bluff in Door County, a point slightly westward of Little Sturgeon Bay. The waters northeast of this line are defined as belonging to Lake Michigan and fishing therein is governed by the Lake Michigan regulations which prescribe among other things a 2⅝-inch mesh gill net for chubs and herring in contrast to the 2⅜-inch mesh gill nets permitted in the waters southwest of the line, defined by law as Green Bay.

LAKE ERIE

One investigator was assigned to the fishery work on Lake Erie conducted during the period April 24 to December 4. In addition to the collection of samples of the commercial catch, a careful study was made of the fishing characteristics of a newly designed trap net evolved from our previous experimental work. The field data indicate that by the adoption of this net for commercial fishing in Lake Erie significant millions of immature fish will be saved in the lake each year, a large amount of labor will be eliminated in the sorting of fish by the fishermen, and thousands of dollars will be saved the industry by the reduction of the wear and tear on nets during sorting.

Field operations on the limnology of western Lake Erie, carried on by Dr. Stillman Wright in cooperation with the Ohio Division of Conservation, have been completed. Observations were made during the period April to October. The combined staff of six investigators made an intensive study of the chemistry, plankton, and bottom organisms near the mouths of important rivers in an attempt to determine accurately the limits of polluted areas. Reports by the various investigators are now being prepared. When completed, they will be incorporated into a single report covering five years of study.

LAKE HURON

Field work on the experimental fishing of pound nets in Saginaw Bay was completed during the summer of 1930. This work described in previous reports covered a period of two years and was carried on jointly with the Conservation Department of the State of Michigan.

WISCONSIN INLAND LAKES INVESTIGATIONS

The investigations of the inland lakes of northern Wisconsin which the bureau conducted in cooperation with the Wisconsin geological and natural history survey in 1927 and 1928 were resumed in the summer of 1930. Dr. Ralph Hile of the Bureau of Fisheries and Edward Schneberger of the University of Wisconsin made collections of fish scales for age studies during the months of July and August and most of September, obtaining data from a total of 4,921 fish.

The collections of three summers have made available for growth study, material from approximately 12,000 fish. The forms most numerous are the perch, cisco, rock bass, bluegill, and sucker. There are also included 1,175 game fish—muskellunge, pickerel, pike perch, and black bass. A large part of the game fish have been furnished by sport fishermen who are supplied with packages of scale envelopes, along with directions for taking the desired data.

The study of the growth of the perch and the game fish is being made by Mr. Schneberger, while Doctor Hile is investigating the rock bass, bluegill, and cisco. In the past, collections have been made from a considerable number of lakes, but it is planned, in the future, to concentrate efforts on a few selected typical lakes, so that attention may be given to growth problems of a more special nature.

LIMNOLOGICAL STUDIES

Investigations were continued on the lakes of northeastern Wisconsin during the summer of 1930 by the Wisconsin geological and natural history survey. The Trout Lake laboratory of the survey was opened on June 20 and work was continued until September 15. These studies are entirely supervised and largely financed by the survey, but in recognition of the bureau's modest cooperation the following report has been submitted by Prof. Chancey Juday, and because of its intimate relation to other undertakings by the bureau is published here.

The field party consisted of E. A. Birge, C. Juday, Edward Schneberger, Hugo C. Baum, J. P. E. Morrison, Ruby Bere, J. B. Goldsmith, C. A. Herrick, biologists, and Frederick J. Stare and Theodore Setterquist, chemists. Dr. Ralph Hile of the U. S. Bureau of Fisheries also was at the laboratory in cooperative work on the fish problem. During the month of August, W. L. Hafner of Armour Institute, Chicago, was employed in connection with hydrographic surveys of a number of lakes.

The field studies included such items as hydrographic survey of 20 lakes, the temperature, transparency, color, the conductivity of the water and the rate at which the sun's energy is absorbed by the water in different types of lakes. The chemical determinations consisted of hydrogen-ion concentration, free and fixed carbon dioxide, dissolved oxygen, oxygen consumed, and calcium. The biological phases of the work consisted of quantitative studies of the net and centrifuge plankton, a further study of the aquatic Mollusca of the district, the leech fauna of a number of lakes, the collecting of fish for growth studies, and a study of the external parasites of the fish.

In the hydrographic work, 20 lakes were surveyed and sounded. The area and volume of 19 of these lakes have been determined so far. The contours of Trout Lake are very complicated and the measurements and computations on it have not been completed. The area of the other lakes ranges from 1.2 to 230 hectares and the volume from 66,780 to 23,302,000 cubic meters. The determination of the volumes of these lakes makes it possible to ascertain approximately how much organic matter and dissolved salts are contained in the entire body of water.

The work was extended to 50 new lakes in the district during the summer; this makes a total of 529 lakes that have been visited in the six summers (1925–1930) that the investigation has been in progress. This completes the general survey of the more important lakes of this region, and it is now the plan to take up more intensive work on a few lakes which represent the various types that have been found in the district.

In 1930 as in 1929 a large amount of work was done with the pyrlimnometer on the relation between solar radiation and the lakes. A new line of study was entered upon, namely the composition of the energy spectrum as determined by the use of light filters. It was found that in this way accurate and detailed knowledge can be secured of the distribution of the radiation at different depths in lakes, to the several regions of the spectrum. Since at depths of 1 meter, and over, practically only visible radiation remains, this study is concerned with the quantitative distribution of light in the lakes. It is possible to ascertain not only the quantity of light present at any depth within the competence of the instrument, but also the percentage of the quantity that is present, as, say a yellow light, or from the region of the spectrum between 5000–6000 Å. It is expected that this study will serve as a basis for the investigation in lakes of the relations between light and the growth of algæ—the fundamental food supply of lakes.

Work was continued on the studies of 1929 relating to the transmission of total radiation also as well as that of the several colors. The season was very favorable for these studies. Fifty-one lakes were visited, many of them several times, and 74 series of observations were made which included more than 9,700 readings of the pyrlimnometer.

Determinations of hydrogen-ion concentration, carbon dioxide, dissolved oxygen, oxygen consumed, and calcium were made on 239 different lakes during the summer. The dry organic matter in the centrifuge plankton was determined on 252 samples and 139 samples of water were evaporated in order to obtain residues for further chemical analyses.

A wide variation in organic and mineral content was found in the various lakes; the dry residues ranged from a minimum of 13 to a maximum of 116 milligrams per liter of water. Likewise there was a wide range in the conductivity of the water, varying from 8.5 to 115 when expressed in terms of the reciprocal of the megohms resistance. The color of the water in these lakes varied from none to a maximum of 240 based on the U. S. G. S. standards of the platinum-cobalt scale. This wide variation in color causes a correspondingly wide variation in the rate of absorption of the sun's energy by the waters of the various lakes.

The hydrogen-ion concentration ranged from pH 4.8 to 8.6; the lowest values were found in the very soft water lakes and the highest ones in the lakes with considerable amounts of fixed carbon dioxide and with abundant growths of phytoplankton. The fixed carbon dioxide ranged from 0.7 to 31 milligrams per liter of water; the smallest amounts were noted in lakes that have neither an inlet nor an outlet.

The dissolved oxygen in the surface water varied from 5.8 to 10.6 milligrams per liter; the smaller quantities of oxygen were found in lakes that possessed boglike conditions while the larger amounts came from lakes supporting an abundant growth of phytoplankton.

The oxygen consumed, as determined by the permanganate method, ranged from about 1 milligram to 26 milligrams per liter of surface water. It was usually somewhat lower in the bottom than in the surface water of the deeper lakes. This determination gives a general idea of the amount of organic matter present in a readily oxidizable condition in the water. There is a certain degree of correlation between the quantity of oxygen consumed and the amount of vegetable coloring matter in the water.

The quantitative studies of the iron showed that only a small amount is present in the surface water. The quantities ranged from a trace to 0.26 milligram per liter of water in the various lakes. Larger amounts were found in the lower water of the deeper lakes in some cases, especially where the dissolved oxygen all disappeared from the lower stratum in summer.

The quantity of calcium in the surface water varied from a minimum of a little less than 0.2 milligram per liter to a maximum of 20 milligrams, a hundredfold difference. The lakes that have neither an inlet nor an outlet possess the smallest amounts. The quantity of calcium is approximately 50 per cent as much as that of the fixed carbon dioxide, more especially when the fixed carbon dioxide is 5 milligrams per liter or more.

Several thousand specimens of the aquatic Mollusca have been collected in this lake district during 1929 and 1930. A taxonomic report on the various species and their distribution in that region is almost completed. One of the interesting facts brought to light in this phase of the work is that the small bivalves belonging to the genus Pisidium occur in considerable numbers in some of the very soft water lakes, where the water has a pH of 5.2 and only 0.15 milligram of calcium per liter.

Specimens of leeches were obtained from 38 lakes, but no thorough survey of the leech population was made on any of them. A total of 18 different species was represented in the various lakes.

In the study of the external parasites of the fish, 1,300 specimens belonging to 11 different species of fish were examined. Of this number only 28 specimens, or a little more than 2 per cent, harbored parasitic copepods. The largest number of these parasites found on a single fish was about 20 Ergasilus on a rock bass from Allequash Lake. Most of the other 27 parasitized specimens carried only a small number of the copepods, two or three up to a dozen. Only two forms of parasitic copepods were found on these fish and both of them represent new species. A report on them is now ready for publication. Leeches were found on only 10 of the 1,300 fish examined.

Over a thousand fish were examined for internal parasites; of this number 657 were yellow perch, 166 ciscoes, 170 rock bass, and a small number of specimens belonging to two or three other species. The different species of fish showed very marked differences in the percentage of infestation in the various lakes. In the ciscoes, for example, 66 per cent of the specimens from Muskellunge Lake were free of internal parasites while only 8 per cent of those from Silver Lake were not parasitized. Only 3 per cent of the yellow perch from Muskellunge Lake gave negative results, while almost 98 per cent of those from Weber Lake were negative. Specimens of rock bass from three lakes (Muskellunge, Nebish and Silver) were examined and all of them were parasitized. Also the smallmouth black bass were found to be heavily parasitized in Nebish and Silver Lakes. The parasites belonged to four different groups, namely, Myxosporidia, Trematoda, Cestoda, and Acanthocephala.

During the present academic year (1930–31) 5 research assistants are working on the material that was collected during the summer of 1930 and in previous summers; 3 of these assistants are chemists and 2 are biologists. One of the chemists is making quantitative determinations of the organic carbon and organic nitrogen in the lake residues, another is making a similar study of silica and calcium, while the third is working on magnesium and hydrocarbons. One biologist is counting the organisms in the net and centrifuge plankton catches, and the other is studying the scales of the yellow perch in order to determine the rate of growth of this fish in different lakes.

At the present time (December, 1930) five different reports on various phases of the work are practically ready for publication; at least four of them will be published before the 1st of July, 1931.

PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

On November 1, Dr. Willis H. Rich who, in conjunction with the late Dr. Charles H. Gilbert has planned and directed the scientific work of the Bureau of Fisheries in Alaska for the past several years, resigned from his position as director of Pacific Fishery Investigations to become a member of the faculty of Stanford University. The bureau hopes to continue to have the benefit of his experience and advice in the future. J. A. Craig is now acting director of the Pacific coast laboratory.

No new investigations have been initiated during 1930. All of the previously planned programs have been carried out, and satisfactory progress has been made. These investigations have as their objective the solution of biological problems related to the conservation of the fisheries of Alaska.

ALASKA SALMON

Tagging experiments.—The salmon-tagging experiments, which have been carried on in Alaska since 1922, were continued during the season of 1930. Approximately 3,500 tags were attached. About

2,000 of these were put on salmon taken from traps in the region of Cape Fox, Sitklan, and Kanaganut Islands, and the remainder on salmon taken from traps in Clarence Strait both north and south of the entrance of Kasaan Bay.

The experiments in the Cape Fox district were undertaken at the request of the Canadian fishery authorities and were designed to test the extent to which these traps caught salmon bound for streams in British Columbia. Those in the region of Kasaan Bay tested the extent to which the traps near the entrance to Kasaan caught fish bound for the spawning grounds contiguous to that bay.

Approximately 1,000 tags have been returned with data as to the time and place of recapture. These data are now being collated, but the study is still too incomplete for definite conclusions. A report covering the results will be presented in the near future. The work was carried out by Frank Hynes of the Alaska service under the general direction of Dr. W. H. Rich.

During the year a report by Seton H. Thompson, dealing with the tagging experiments of 1929 was published in the Bulletin of the bureau as Document No. 1084.

Statistics of the Alaska salmon fisheries.—The study of the statistics of the Alaska salmon fishery has been continued by Dr. W. H. Rich and E. M. Ball of the Alaska service. During the past year a second section was completed and is now in press. The first section published in 1929 dealt with the fisheries of Bristol Bay and the Alaska Pensinsula and the second section covers the territory from Chignik eastward to and including Resurrection Bay. Data are presented showing, as far as possible, the catches in each locality from the beginning of the industry up to 1927. It is not possible to draw any satisfactory general conclusions since each small geographical district represents a separate unit. It is of interest to note, however, that many of the smaller red-salmon streams show extreme depletion throughout the district considered and a more moderate degree of depletion is found in even the large red-salmon streams. With few exceptions there is no evidence from the data presented that serious depletion has affected any of the other species.

Karluk red-salmon investigations.—The study of the returns from known escapements of spawning salmon, which has been adequately described in previous reports, was continued during the year of 1930. Data were secured on the return of 7-year fish from the 1923 escapement, of 6-year fish from the 1924 escapement, of 5-year fish from the 1925 escapement, and of 4-year fish from the 1926 escapement. The data are now complete for the escapements of 1921, 1922, and 1923. The escapement of 1921 consisted of about 1,500,000 fish, and the returns were approximately 3 to 1. The escapement of 1922 totaled about 400,000 fish, and the return was approximately 5 to 1. The escapement of 1923 numbered 695,000 fish, and the return was approximately $2\frac{7}{10}$ to 1. Valuable as are the results so far at hand, many more data will be necessary before any definite conclusions can be drawn regarding the situation.

The marking experiments, started in 1926, were continued. Fifty-five thousand red-salmon fingerlings were marked as they were migrating to the sea. The commercial catch was sampled for the return of marked fish from the marking of 1927, 1928, and 1929, but on account of the poor run and consequent very limited catch, the data secured were inadequate as a basis for definite conclusions.

Two trips were made to Karluk Lake. Limnological data were collected on each trip and observations were made as to conditions on the spawning grounds. This investigation has been carried on by Dr. Willis H. Rich, who was assisted by J. T. Barnaby.

Chignik red-salmon investigations.—An investigation of the red-salmon runs of Chignik River, Alaska, has been continued by Harlan B. Holmes, associate aquatic biologist, assisted by Sidney B. Hayes and Hugh R. Israel, temporary assistants. Unusual irregularities in the growth and migrations of the fish are making it necessary to devote considerable attention to preliminary problems before attacking the basic problem of determining how many fish must be permitted to pass up the river to spawn in order to produce the greatest surplus to be taken by the commercial fishery. These preliminary problems were discussed in the report for 1929. Investigation of them was started in 1928 by a study of the seaward migration of fingerlings. In 1929 the work was extended to include studies of the life of the young fish in fresh water and methods of sampling the run of mature fish. The run of mature fish in 1929 was unfavorable for the study of sampling because the age composition of the run was unusually constant. Plans were made to repeat extensive sampling in 1930, but again conditions were unfavorable: this time as a result of a small run that made it necessary to prohibit commercial fishing for the greater part of the season.

The study of the young fish in fresh water was continued in 1930, particular attention being given to the fish in Chignik Lake, the lower of the two lakes, and to the seaward migrants. The complex situation observed in 1929 was found to prevail again in 1930. Fish ranging from fry that had recently emerged from the gravel of the spawning beds to fingerlings 10 centimeters in length were found throughout the season. Between these limits of size they were distributed in an array that practically defies age analysis by means of length frequencies. It is hoped, however, that further analysis of the data accompanied by a study of the scales of the fish will make it possible to determine the age of the fish with reasonable certainty.

The seaward migration of fingerlings, as in previous years, was found to extend throughout the summer. Fifty thousand of the migrants were marked by the removal of two of their fins. The recovery of some of these marked fingerlings several weeks after they had been marked confirmed other evidences of a leisurely migration, a condition quite different from that at Karluk for example, where several million fingerlings pass down the river and disappear in a period of a few weeks. The fingerlings were traced even into the ocean where they were found in all the neighboring bays for the greater part of the summer.

Pink-salmon investigation.—This investigation is concerned with the application of the "parent stream" theory to the life history of the pink salmon and with the survey of the streams in which they spawn. The latter is being made for the purpose of ascertaining some of the biological factors underlying the fluctuations in their abundance. Dr. F. A. Davidson has had charge of these investigations.

In February of 1930, 36,000 pink-salmon fry were marked at the Duckabush hatchery on Hoods Canal, Washington. The marking was accomplished by means of clipping their dorsal and adipose fins. This is the first time that the marking of pink-salmon fry has been accomplished. The runs in Duckabush River and neighboring streams of Hoods Canal will be carefully examined in the fall of 1931 for adult salmon bearing the marks. The Hoods Canal region is unique in that an examination of its many streams will provide a means of determining the degree of homing instinct of the pink salmon, that is, whether they return only to the stream in which they were hatched or whether they return to the streams of a general region. Preparations were made to mark pink-salmon fry in Snake Creek at Olive Cove, Alaska, in the spring of 1931.

FIGURE 5.—Shack used as a laboratory for pink salmon investigations at Olive Cove, Alaska

The marking experiments in Alaska will be supplemented by a racial analysis of the pink salmon in the various streams throughout the territory in which the fry are marked. During the summer of 1930 weekly samples were taken of the pink salmon running into Snake Creek at Olive Cove and into Anan Creek in Bradfield Canal.

The racial characteristics of the pink salmon composing these samples were analyzed biometrically for the purpose of determining:

(1) Differences in the racial characteristics of the salmon entering a given stream at different times during the run. This has an important bearing on the method of sampling the fish population in a stream. For example, if the population is homogeneous with respect to racial characteristics throughout the run, then a representative sample may be secured at any time during the run. However, if the population is not homogeneous throughout the run, then samples must be taken at regular intervals in order to secure a representative sample of the population.

(2) Differences in the racial characteristics of the pink-salmon population in Snake Creek and in Anan Creek.

The results from this part of the investigation are not as yet complete, hence it is not possible to draw any conclusions from them at the present time.

A list of all the important pink-salmon spawning streams in southeastern Alaska has been compiled. The streams in this list are classified according to the fishing districts in which they are found, and with the tabulation of each stream is included its name and location in degrees of latitude and longitude. Thus far only 45 streams have been surveyed in the territory. After a large number of streams have been surveyed, an analysis will be made of the data collected during the survey of each stream. It is hoped that this analysis will aid in determining some of the biological factors underlying the fluctuations in the size of the pink-salmon spawning populations in the streams.

There have been numerous requests from the packers in southeastern Alaska for an extension of the fishing season. They contend that the fishing regulations instituted in 1924 are protecting the late running salmon more than the early running salmon. They further contend that this unbalanced protection is tending to destroy the early runs and build up the later runs with the result that the bulk of the salmon are coming in later each year. In view of these contentions, an analysis is being made of the daily trap catches of pink salmon during the fishing seasons from 1908 to 1930 for the purpose of determining the variability in the time of appearance of the pink-salmon runs in southeastern Alaska both before and after the institution of the fishing regulations. The results from this investigation are not as yet complete.

Bristol Bay red-salmon investigation.—The scientific work in the Bristol Bay region during the past year has been devoted largely to a study of seasonal catch records and of the age at maturity of the red salmon of the Nushagak district. Alan C. Taft has conducted these investigations.

The analysis of the catch per unit of effort at Nushagak has shown that the total catch, when considered in relation to the changes in total effort, is a fair indication of abundance. The study of the catch per unit of effort has disclosed the same rate of decline up to 1921, which was found by Rich and Ball in their work on the total catch. The most serious decline was apparent in the period immediately following the war and undoubtedly was due to the intensive fishing during that time. Since 1921 there has been an upward trend in both the total catch and the catch per unit of effort. This, probably, has been due in part to the regulatory measures and closed periods instituted by the Bureau of Fisheries.

The catch per boat was also used in a study of the correlation between the annual catches at 4, 5, and 6 year intervals. The results were in keeping with those of Rich and Ball, who found a high correlation at 4-year intervals, but no significant positive correlation at 5 or 6 year intervals. The correlation at 4-year intervals is particularly marked in the series of cycles starting with 1903 and including 1907, 1911, 1915, 1919, 1923, and 1927. All of these years were distinctly below normal. This evidence of a high correlation at 4-year intervals will be useful in the formulation of regulations until an exact knowledge of the prevailing ages at maturity can be obtained by a scale study.

The preliminary scale work has shown that although 4-year fish are numerous, there is also a large number of 5-year fish in most of the annual samples. Work is now being continued which includes a study of the ages of fish from the two main rivers, the Nushagak and the Wood.

The field work during the past summer included an inspection of all the principal fishing areas in Bristol Bay. Trips were made up the Naknek and Ugashik Rivers as far as the weirs; and scale and migrant collections were made at Kakwok, 80 miles up the Nushagak. After the close of the commercial fishing season, a trip was made to Wood Lake for the purpose of collecting young salmon and visiting the spawning grounds.

Several of the principal spawning grounds of Illiamna Lake were inspected in the early part of August and in all cases there was a marked deficiency in spawning fish.

In addition to the scale collections made during the commercial fishing season, arrangements were made to have Frank Waskey collect scales from a series of 1,000 fish taken by natives on both the Nushagak and Wood Rivers.

Copper River red-salmon investigations.—During the past year the investigation of the red salmon of the Copper River has been continued by Seton H. Thompson, who devoted the greater part of the time to making a comprehensive collection of scales from fish taken by the commercial fishery and to studying the growth of the young salmon in Gulkana River, one of the important spawning grounds of the Copper River. Scales were also collected from adult fish spawning in the various tributaries. Many of the scales appear to be relatively easy to read, but others present irregularities that can not be interpreted with certainty until a very detailed study of the young fish has been made. Since each tributary and its lakes presents different environmental conditions, the study of the fresh-water growth of the scales is very complex. Five widely separated tributaries of this great river system are known to be important spawning grounds for the red salmon and many tributaries are still unexplored. A definite program has been outlined, and this work will be continued.

COLUMBIA RIVER SALMON

As in previous years the Bureau of Fisheries has cooperated with the Oregon Fish Commission in conducting salmon-marking experiments. One new experiment with fingerlings of a landlocked species, *Oncorhynchus kennerlyi*, was started. A previous experiment with this species resulted in a few recoveries which seemed to indicate that these landlocked fish could be induced to become sea-run and contribute to the commercial fishery. The returns from the first experiment were too few to be conclusive, and it seemed advisable to repeat the experiment.

Very few returns of marked fish were anticipated in 1930 but these few form a valuable part of the records obtained over a period of years.

ALASKA HERRING

In December, 1930, a scientific report was submitted to the bureau for publication by George A. Rounsefell who is in charge of the herring investigation, showing the changes in abundance that have occurred in southeastern Alaska during the past several years. In this analysis a study was first made of the effect of the regulations that have been in force at various times, and of the effect on the catch of the improvements in the unit of fishing effort—the purse-seine boat. Southeastern Alaska was divided into 33 areas to correspond roughly to natural fishing grounds; and the abundance studied in the individual areas by means of the average daily catch per boat, the average number of deliveries per week per boat, and the average weekly catch per boat.

The report showed that a few of the areas were severely depleted, especially those in the central portion of Chatham Strait and those on the southern and eastern shores of Admiralty Island. Recommendations were made that these areas be closed to all seine fishing for at least five years. It was also recommended that the seining season be opened July 1 instead of June 1 in Stephens Passage and Lynn Canal; that the areas including Point Gardner, Saginaw Bay, and Keku Strait be closed to seining except during August; that the western shore of Kuiu Island from Point Kingsmill to Point Crowley be closed to seining during July; and that the weekly closed season for seining be extended to 48 hours along the southern shores of Baranof Island, from Red Bluff Bay to Crawfish Inlet. No recommendations were made for any of the other areas, including such productive fishing grounds as Icy Strait, Sitka Sound, Coronation and Warren Islands, and Noyes Island.

During the summer of 1930 intensive field work was carried on in southeastern Alaska by Edwin H. Dahlgren, temporary scientific assistant. In addition to the regular samples, racial data were obtained for the first time from the following localities: Cape Edgecumbe, Peril Strait, Kelp Bay, Warren Island, and Noyes Island. In southeastern Alaska large racial samples, including vertebral counts, are now available from 32 localities and small samples from about as many more. Altogether data are available on 10,000 specimens. The ages have been determined from the scales for over 7,000 of these specimens, and as soon as the age readings are completed an intensive racial analysis will be made.

As usual bureau representatives collected and preserved in formalin the annual series of samples for the fisheries at Prince William Sound, Afognak Island, Shearwater Bay, and Dutch Harbor.

Length data are now available for seven years, and age data for six years in Prince William Sound. These are now being carefully analyzed for fluctuations caused by dominant year classes and together with an analysis of the catch records, will soon be presented in a report on this district.

RAZOR CLAM OF ALASKA

Observations were continued by Seton H. Thompson, temporary assistant, on the razor-clam beds in the vicinity of Cordova, Alaska, during the 1930 season. With a slight increase in intensity of fishing, approximately the same pack was prepared in 1930 as in 1929. Both of these packs exceed those of the preceding three years in that district.

Although this fishery was slightly more intensive than in 1929, the age composition of the commercial catch reflects the rigid enforcement of the regulations and the cooperation of the canners, and indicates that the industry is on a stable basis. The clams varied from 3 to 13 years in age. Over 80 per cent of the clams were older than 6 years, and 86.48 per cent of all clams taken were mature. Of the total number taken 60 per cent had spawned more than once.

THE COCKLE

Material collected during the early razor-clam studies included shells of the cockle (*Cardium corbis*) from several localities on the Pacific coast ranging from Tillamook, Oreg., to Port Moller, Alaska. Although the amount of material was relatively small the homogenity of the samples and the uniformity of clam growth made it excellent material for growth studies and several interesting features have been presented in a report by Dr. F. W. Weymouth, of Stanford University, and Seton H. Thompson, temporary assistant.

(1) The ring method of age determination may be applied to this as well as to others previously studied.

(2) The growth of *Cardium* is characterized by great regularity as shown by the individual growth curves.

(3) The type of growth observed in the razor clam is also found in the cockle. In this form the relative growth rate falls throughout postlarval life as first noted by Minot in the guinea pig. The decline is orderly and regular and in most cases the growth curve can be accurately fitted from the formula $L=Be^{-ce^{-kt}}$ based on an exponential rate of decline of the relative growth rate.

(4) A comparison of growth in different localities shows the same relations as observed in the razor clam. The northern forms, in contrast to the southern, show a slower initial but more sustained growth, and reach the greater age and larger size.

ROGUE RIVER STEELHEAD TAGGING

During the summer of 1929 a tagging experiment dealing with the steelheads of the Rogue River was initiated in cooperation with the Oregon State Game Commission. This investigation has been under the supervision of J. A. Craig, and the work has as its definite object the solution of the problem of whether or not there are two separate races or self-propagating populations of steelheads in the Rogue River, one of which makes its upstream spawning migration during the summer and early fall and the other during the late fall and winter.

It seems logical to suppose that if there are two separate populations or races of steelheads in the Rogue River their spawning activities must be separated either by time or space. In order to discover data relating to the time of spawning and the extent of the spawning migrations of the steelhead in this stream adult upstream migrants were tagged near the mouth of the river during the summer and early fall of 1929 and the summer and fall of 1930. These fish are also being tagged during the winter of 1930-31.

In 1929, 677 steelheads were tagged and 25 were recovered. These recoveries indicate that the summer-run steelheads migrate to the upper reaches of the river and into the higher tributaries, and that they are present in these places in a spawning condition as late as March and April following the summer during which they ascended the stream.

At present the returns from the 1930 operations are by no means complete, and until data are secured on the recovery of winter-run fish no definite conclusions can be made.

CONSERVING FISH LIFE BY MEANS OF SCREENS AND LADDERS

The activities of Shirley Baker, engineer, and U. B. Gilroy, assistant, in conserving fish life by means of screens and ladders, consisted during 1930 of the following distinct undertakings:

(1) The continued operation of electric fish screens in the Yakima country, Washington, and in southern Oregon; (2) experimental work leading to the adoption of a simplified and improved type of electric fish screen and specification of this new type for operation during the irrigation season of 1931; (3) cooperative work with the power companies comprising experiments conducted at Green River hatchery of the division of fisheries, State of Washington, with a view to using the electric screen to lead upstream migrating salmon to a trap; (4) completion of the installation of the Ahtanum mechanical fish screen and its operation throughout the irrigation season; (5) the installation of large, concrete fish ladders at the Wapato and Sprague River Dams; (6) inspections and reports on conditions at several major power developments now under construction on important salmon rivers in the Northwest; (7) specification of fish-protective works required at certain hydroelectric power developments; (8) report on several types of mechanical fish screens and recommendations for screening several large water diversions in the State of Montana; (9) participation in the salmon-counting experiments conducted at Savage Rapids Dam on the Rogue River, Oreg.; (10) field work, designs, and reports on improvement to the water-supply system at the Bureau of Fisheries hatchery at Tishomingo, Okla., and for the proposed new hatchery at Butte Falls, Oreg.

MECHANICAL FISH SCREENS

From time to time during the course of this investigation we have been asked to examine and report on mechanical fish screens of various types. The variety of designs for such fish screens is very great, but nothing that has been called to our attention has been found to equal the mechanical revolving screen developed some years ago by the Oregon Game Commission and now approved and installed at a number of sites by that commission, by the Division of Fisheries of the State of Washington, and by our own bureau. A mechanical screen of this type was installed by the bureau in 1929 in the Ahtanum Canal, of the United States Indian Irrigation Service, Yakima, Wash., and is described in the previous report. Observation of the action of the fish at this installation substantiates the conclusion that a submerged orifice type of entrance is superior to an overfall in attracting downstream migrating fish into a by-pass. This installation was 100 per cent effective in screening out the fish.

At the present time the bureau has under consideration the installation of such a mechanical screen in one of the Government diversions in Montana and is assisting the State of Michigan authorities by examination and reports covering the screening problems in various sections of that State.

ELECTRIC FISH SCREENS

In the work of this investigation the electric fish screen has been applied to three major problems confronting fish conservation, the device being employed: (1) As a stop or diverter to prevent the small, downstream migrating fish from entering irrigation and power diversions; (2) to stop or divert the mature, upstream migrating fish from entering tailrace waters at power houses; and (3) as a guide to lead upstream migrating fish to some particular location in the channel such as a counting weir or hatchery trap.

Patents on electric fish screens have been granted to H. T. Burkey, whose activities in the early development of the electric fish screen are related in the two previous reports. The type of screen now in use by the Bureau of Fisheries has departed widely from Mr. Burkey's original design and now conforms to the design developed and advocated by Professor McMillan.[3] The use of the old style grounded type of electric screen consisting of a row of suspended chain electrodes and a pipe, or similar ground element, laid in contact with the bed of the channel, has now been definitely abandoned in favor of the insulated type of screen consisting of a double row of large diameter pipe electrodes suspended into the water and entirely insulated from contact with the channel. Such a screen, due to the large diameter of the electrodes, eliminates the undesirably high voltage gradients which existed around the chain electrodes previously used, and the whole installation, being insulated from ground, is independent of the effects due to the conductivity of the channel material. Thus, the new screen is free from those defects due to the distorted and badly distributed electric field which, at certain locations, were unavoidable with screens of the grounded type.

Sunnyside electric screen.—The Sunnyside Canal, main diversion of the Yakima project, United States Reclamation Service, diverts water from the Yakima River, near Yakima, Wash.

The electric screen employed in this canal was of the grounded type, the spacing between chain electrodes being 24 inches and the ground element being a 2½-inch diameter galvanized pipe, laid flat on the bottom of the canal, parallel with the curtain of chain electrodes and 9 feet upstream from it. Electrification of the screen was effected with 60-cycle alternating current passed through the sign-flasher interrupter (2 to 20 interruptions per second) applied to the screen at voltages varying from 60 to 80 volts.

As commented on in the 1929 report operating conditions at this site were especially severe when high water caused increased velocities and the accumulation of débris at the screen, but results of the check of fish left stranded in the system in the fall of the year, together with observations made during the irrigation season lead to the conclusion that this screen has effected the saving of a good percentage of fish passing down river, and its use is held to be justified.

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[3] Electric Fish Screen, by F. O. McMillan. Bulletin, U. S. Bureau of Fisheries, Vol. XLIV, 1928 (1929). Document No. 1042. Washington.

Wapato electric screen.—The Wapato Canal of the U.S. Indian Irrigation Service diverts water from the Yakima River about 3.5 miles upstream from Sunnyside Dam. Capacity of the canal is 1,800 second-feet. The 1930 diversion period extended from March 11 to November 22. For the major part of the irrigation season the amount of the diversion was close to the capacity of the ditch.

The screen employed here during the 1930 season was the same as described in the 1929 report. Although a good amount of water overflows the Wapato Dam at all times the depth of flow on the crest of the dam is shallow. On the other hand, the intake gates lift off the floor of the intake where the depth of water is approximately 20 feet, making the suction very great. This fact, coupled with the very high water velocities existing along the line of the electric screen, created a situation quite unfavorable to the successful by-passing of fish diverted by the screen.

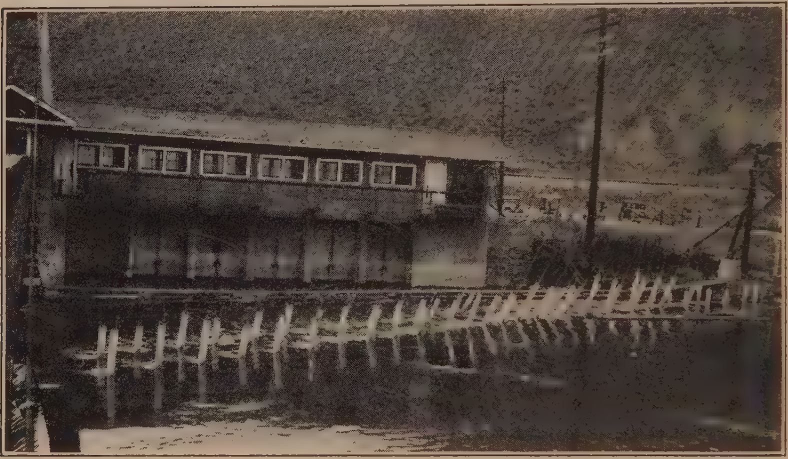

FIGURE 6.—New electric screen at Wapato intake. See Figure 6, Fisheries document No. 1096, for a view of earlier installation

To overcome, as much as possible, these undesirable conditions, the new screen planned for 1931 will be supported farther out in the forebay where water velocities are lower and will be of the improved insulated type with large electrodes energized with 60-cycle alternating current from a transformer.

A comprehensive check on the fish left stranded in the Wapato system was made at the end of the irrigation season, and additional information on this subject was secured when the principal laterals were dried up for cleaning in midsummer. Consideration of these findings and observations as to the presence of fish both in the river and in the ditch system indicates that in spite of the poor by-pass facilities and the unfavorably high velocities prevailing at the intake this electric screen has diverted a considerable number of fish and thereby justified its use.

Old Indian Canal electric screen.—As commented on in the 1929 report the Old Indian Canal which diverts water from the Yakima River and discharges it into lateral No. 1 of the Wapato Canal had, in its unscreened condition, permitted a large amount of fish to enter the Wapato system last year. To remedy this condition the Bureau of Fisheries installed an electric screen at the Old Indian Canal intake in the spring of 1930.

The screen employed was of the grounded type as has been previously described. Its location was just in front of the head gate and at a slight angle with it. At this location water is diverted into the canal by means of a low rock and brush dam. It was possible to maintain a favorable by-pass flow adjacent to the screen for the majority of the time.

If fish enter the Old Indian Canal they are discharged directly into lateral No. 1 of the Wapato Canal and are thus accounted for in the check of fish in the Wapato system. Water velocities at this location are not unreasonably high, and this factor along with the good by-pass facilities prevailing here argues well for the successful operation of this electric screen.

Tieton electric screen.—The Tieton Canal of the United States Reclamation Service diverts water from Tieton River at a point about 35 miles northwest of Yakima, Wash. The capacity of the canal is approximately 320 second-feet and this flow is maintained throughout the irrigation season. The screen is as described in the 1929 report, being of the grounded type consisting of a curtain of chain electrodes spaced 24 inches center to center and a ground element of anchor chain, all being located outside of the canal head gates.

Check of fish left stranded in the Tieton system together with observations regarding fish conditions along the Tieton River above and below the head gate and in the canal itself indicates satisfactory functioning of the electric screen at this installation.

Naches power house electric screen.—In the early summer of 1930 the Pacific Power & Light Co. electrified the screen which they had installed the previous year under the supervision of the bureau. This installation is located at the head of the Wapatox Canal, which diverts water from the Naches River for use at the Naches and the Drop power plants near Yakima, Wash. The ditch has a capacity of about 600 second-feet. The screen is of the grounded type, consisting of a curtain of chains and a ground element of pipe laid in contact with the bed of the concrete-lined canal. This screen is located a short distance down the canal from the head gates and adjacent to the spillway which, throughout the spring and summer months, offers an excellent by-pass channel for return of fish to the river.

Observation of fish conditions in the Naches River in the vicinity of this diversion and inspections of the canal itself from time to time during the summer indicated the high efficiency of this screen. During the period that an adequate by-pass was maintained, which was during the principal migration season, it is estimated that at least 90 per cent of the fish entering the Wapatox Canal were diverted through the by-pass by the electric screen.

Gold Ray intake screen.—As detailed in the 1929 report this electric screen of the insulated type was installed last September in the intake at the Gold Ray power plant, Rogue River, Oreg. This screen consists of a double row of 6-inch diameter pipe electrodes, spaced 6 feet between rows, the pipes being 4 feet center to center in rows.

The screen was installed again in the spring of 1930 and operated until the Gold Ray plant shut down for a period to allow the construction of a new trash rack and head-works structure. The screen was reelectrified late in the summer and continued in operation until late in the fall. The power plant was shut down during the peak of the downstream migration, and, therefore, conclusions as to the effectiveness of the screen are unwarranted.

Gold Ray tailrace screen.—The purpose of this screen installation is to prevent the upstream migrant salmon and steelhead from entering the tailrace waters at Gold Ray power plant and to divert them in fresh condition into the main channel of the river leading to the fish ladders over the dam. This screen, which was of the grounded type described in detail in the 1929 report, continued its highly effective operation until May 8, 1930, at which time the power plant was shut down for the installation of the new head-works structure referred to above.

Soon after the screen was put in operation it was observed that a number of Chinook salmon and steelhead were penetrating the screen and that some others were being paralyzed in their passage over the ground pipe. Accordingly, the grounded type of installation was abandoned in favor of the insulated screen. The new screen was electrified July 17. It consists of a double row of 6-inch diameter pipe electrodes of No. 20 gage galvanized iron which are suspended in the water from supporting cables. Spacing of the pipes is 4 feet center to center in rows, and the rows are spaced 6 feet apart. The lower end of each electrode is fitted with a hemispherical cap of galvanized iron and filled with concrete to provide the necessary weight to hold the electrode vertically in the water. The screen is energized with 60-cycle alternating current passed through the special transformer.

Prior to the electrification of the new screen the tailrace was cleared of fish and since that time none has been found above the screen. The conditions for observation of the action of the screen are excellent and hundreds of salmon and steelhead have been seen to encounter the screen and be diverted without injury into the main channel. The action of this screen is positive, and its continued operation is held to be a factor of major importance in the conservation of fish on Rogue River.

Experiments with electric screens for use at intakes.—Seeking improvement and simplification of this type of electric screen the experimental field work started in 1929 was continued in the 1930 season. This year the experimental installations were set up at Old Indian Canal on the Yakima River, in the sluiceway at the Gold Ray power plant, and at the Fort Klamath hatchery of the Oregon Game Commission. The Yakima tests were conducted by Professor McMillan and Mr. Wagner. The fish used were Chinook salmon fingerlings about 4 inches long. These tests demonstrated: (1) The superiority of the insulated type of screen over the grounded type, (2) the superiority of large diameter electrodes over the chain electrodes as previously employed, (3) the effectiveness of ordinary 60-cycle alternating current without resort to interruption or other modification, and (4) they indicated in general the electrode spacing and screen voltages required for effective operation of the screen.

In Oregon the experimental work was started in the sluiceway at Gold Ray power plant and later the installation was moved to the Fort Klamath hatchery where facilities were better as regards visibility, control of water, and the availability of fish for use in the experiments. At the former location the fish used were steelhead fingerlings and at Fort Klamath a total of about 2,000 brook trout averaging about 2 inches long were employed. All of these were fine healthy fish.

The experiments showed the screen to be most effective when the electrode spacing was 4 feet center to center in rows and 6 feet between rows, and when the potential was maintained at about 55 volts.

The experimental work of the 1930 season has resulted in the specification of new and improved electric screens for use in 1931.

Kvichak electric screen.—Based upon success of the Gold Ray tailrace screen in stopping upstream migrating salmon and diverting them to the fish ladders at the dam, the bureau this season sought to employ the electric screen in its salmon-counting operation on the Kvichak River, Alaska. The structure consisted of the ordinary type of wooden rack of picket construction equipped with counting gates and carried out from each shore through the shallower depths. Piles were driven across the main channel to support the electric screen, the alignment of which was in the shape of a V with the apex 200 feet downstream, from the line of the racks. Total length of the electric screen was 755 feet including a 40-foot boat passage at midstream. Design of this electric screen was based on the Gold Ray tailrace installation. It was of the grounded type, consisting of a curtain of chain electrodes and a ground element of pipe laid in contact with the bed of the stream. For energizing the screen the Bureau of Fisheries installed a power unit on shore consisting of a 9-kilowatt generator, supplying 60-cycle alternating current, driven by a 15-horsepower gasoline engine. Current was supplied to the screen at a potential ranging from 60 to 80 volts.

In general, the installation stopped the upstream migrating salmon but failed in its purpose which was to lead or divert these fish to the counting gates located in the rack structures extending out from each shore. Some salmon succeeded in fighting their way through the electric screen which extended over about three-quarters of the river channel but several hundred thousand of them—constituting the greater portion of the run—dropped back downstream after encountering the electrified water and remained there, milling around, and making no further attempt to pass upstream. The reason for the failure of this screen is not known. One unfavorable factor was the absence of definite water currents to attract the salmon to the counting gates. This was because the obstruction offered by the rack structure caused the tendency of the flow at the rack to be offshore along the upstream line of the rack and toward the great open section of the river in which the electric screen was installed. Over the major portion of the screen section the channel depth was about 15 feet and water currents were quite swift.

Experimental electric screen at Green River.—Seeking to develop the electric screen for use in guiding fish to some particular point in the channel the bureau in cooperation with the Northwestern Electric Light & Power Association installed an experimental electric screen at the Green River hatchery of the Washington Division of Fisheries this summer. The facilities and services of the hatchery staff were kindly offered by that body. The location afforded fine visibility and opportunity to experiment on large runs of fish.

The site chosen was favorably located for obtaining a check on the efficiency of the screens inasmuch as the installation was made directly downstream from the wooden rack and trap structure built across the river to obtain fish for spawning purposes. Thus, fish that might penetrate the electric screen were caught against the wooden rack; many thousand Chinook, silver, and dog salmon encountered the screen during the season of its operation. The insulated type of screen was employed, consisting of a double row of 6-inch diameter pipe electrodes suspended in the water from supporting cables. Best results were found to be obtained when the spacing was 4 feet center to center between electrodes in rows, and with the rows 6 feet apart.

The screen was electrified with 60-cycle alternating current supplied from a transformer. For the purpose of studying the guide features of the screen a pool of timber construction resembling the entrance pool to a fish ladder was built at the end of the electric screen on the east bank and water was supplied to this pool to produce an overfall for attracting fish. In addition to this a small creek joins the river from the east about 50 feet downstream from the electric screen. Some salmon have always run this creek and the Green River hatchery maintains a rack in this creek about one-quarter mile above its mouth. It was thought that fish running in Green River, upon encountering the electric screen, might be diverted up the creek.

When electrified at 80 volts the screen effectively stopped the upstream migrating salmon, but was found to be killing a number of downstream migrating fish. When the potential was lowered to 60 or 65 volts the screen was still found to be effective against the upstream migrants and at the same time downstream migrants were no longer affected. The effectiveness of the screen in holding upstream migrating salmon without injury was at once evident; in fact, in order to get fish for spawning purposes it was necessary to deenergize the screen, as practically no fish were able to penetrate the electrified water.

Results obtained, considering the screen as a guide, were held to be very encouraging despite the fact that the presence of the electric screen in the river did not cause any material increase in the number of fish being taken at the creek rack. Reasons for lack of increase in the creek run over previous years are believed to be due to the instinct of the fish to remain in the Green River water rather than to pass into the creek, and physical conditions at the mouth of the creek where the water was deep and there was almost no current. On the other hand the river bed in the vicinity of the screen consisted of gravel bars overrun by shallow water, which was attractive to the fish. A large number were seen to make their nests and spawn here.

At times as many as 15 to 20 salmon would be found in the timber pool located at the end of the electric screen. This evidence of the action of the screen in leading even a small number of fish to the pool is considered quite encouraging as physical conditions at its entrance were not entirely favorable.

FISH LADDERS

The activities of 1930 in the fish-ladder field include: (1) The building of new, modern concrete fish ladders at two Government projects, these being the Wapato Dam on the Yakima River and the Sprague River Dam in Oregon; (2) specification and supervision of construction on alteration of fish ladder at Gold Ray power plant on the Rogue River; (3) inspection and supervision of progress of construction of the fish ladders specified for the Rock Island development; and (4) specification of required fish-protective devices for certain power applications submitted to the Federal Power Commission.

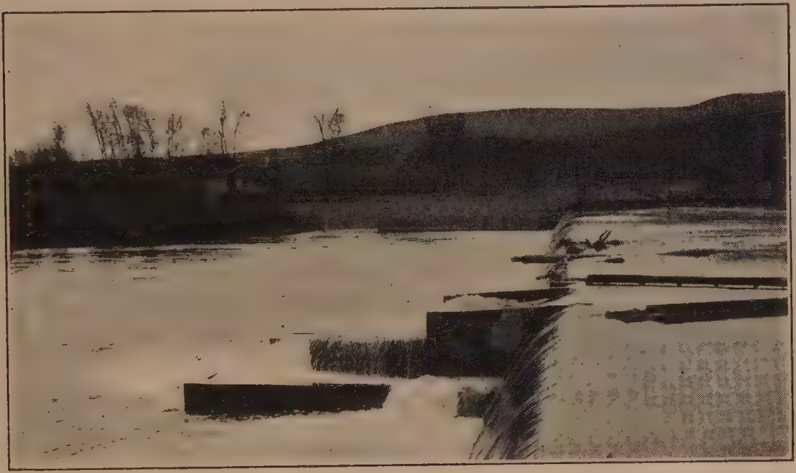

FIGURE 7.—Wapato fish ladder. View looking toward west shore showing side entrance pool and shear boom raft at top of dam

Wapato fish ladder.—The success of the Sunnyside fish ladder built by the U. S. Bureau of Fisheries last year was immediate, and this installation emphasized the need of a similar structure at the Wapato Dam, of the U. S. Indian Irrigation Service, located about 3½ miles up the Yakima River from the Sunnyside Dam. Accordingly, the aid of the Department of the Interior was solicited and funds secured from it for the construction of the ladder. Design of the Wapato ladder followed closely the features of the Sunnyside installation. The U. S. Reclamation Service showed a fine spirit of cooperation in making available to us the services of their construction organization. The ladder has been installed in the east channel of the river at the Wapato diversion. Crest length of the dam is

400 feet. The ladder is located about 100 feet out from the east shore, and has a net height of about 10 feet. The construction work was started late in October and water was admitted to the completed ladder about a month later. A fine piece of construction was secured.

During the fall the Washington State Division of Fisheries constructed a concrete fish ladder at the Prosser Dam at the lower end of the Yakima River. The completion of the Prosser, Sunnyside, and Wapato fish ladders now opens the Yakima River and its tributaries for many miles to the ascending fish.

Sprague River fish ladder.—Conditions at the Sprague River Dam of the U. S. Indian Irrigation Service near Chiloquin, Oreg., have been set forth in the 1929 report, together with an account of the preliminary work done here. Last summer the bureau's engineers prepared designs and specifications for the required fish ladder and early in September a contract was let for this construction. The work was completed late in the fall. The design follows the principles displayed in the Sunnyside ladder and adapts itself to the particular features of the dam and sluiceway construction at Sprague River. This dam is 11.3 feet high.

NEW AND PROPOSED POWER PROJECTS

An important activity falling within the province of this investigation has been in connection with a number of power developments now under construction in the Northwest or pending license by the Federal Power Commission.

The major developments investigated and reported on in 1930 are as follows:

(1) Rock Island development of Washington Electric Co. on the Columbia River, Wash.

(2) Kettle Falls development of Washington Water Power Co. on the Columbia River, Wash.

(3) Flathead development of Montana Power Co. on Flathead River, Mont.

(4) Ariel development of Inland Power & Light Co. on Lewis River, Wash.

(5) Cascade Locks project (Hobson application) proposed for Columbia River at Cascade Locks.

(6) North River development of Western Washington Electric Light & Power Co. on North River, Wash.

At the Rock Island development, remarkable progress has been made. The end of 1930 saw the completion of the power house and spillway dam in the east channel of the river. By this time also, the high fish ladder at the power house had been virtually completed, lacking only fitting up with entrance gates and the installation of stop-log partitions between the pools. This ladder which is 630 feet long is of heavy reinforced concrete construction. The pools are 20 feet wide by 10 feet long and the grade is 1 to 10. A very fine piece of construction work has been done.

Concerning the Kettle Falls development—a project of major size proposed for the Columbia River—examinations were made and conference held with engineers of the power company and with the interested State organizations. This led to the specification of the requirements for fish protection as held to be necessary by the State officials and the Bureau of Fisheries. These specifications have been presented by the Commissioner of Fisheries to the Federal Power Commission for incorporation in the project license if and when issued.

The Ariel development, which is planned for an ultimate capacity of 180,000 kilowatts was visited several times during the summer and fall of 1930. The dam is 180 feet high. Here a very comprehensive scheme of fish protection has been carried out under the supervision of the Division of Fisheries, State of Washington. The plan involves the mechanical handling, ripening, spawning, and rearing of fish on a large scale. Much that is novel has been introduced. The work reflects careful planning and supervision. The fish protective works being provided here will cost approximately one-third of a million dollars.

The North River power project proposes the development of 37,500 horsepower by the building of a concrete dam 112 feet high on the North River, in Pacific County, Wash. The plan for fish protection, as worked out in cooperation with the Division of Fisheries, State of Washington, proposes mechanical handling of both upstream and downstream migrating salmon. Conditions at this site lend themselves to such a procedure.

The important problem of the practicability of handling migrating salmon mechanically at high dams will go on trial at North River, and the work is expected to attract the interest of all concerned with fish conservation.

INVESTIGATIONS IN THE INTEREST OF FISH CULTURE

Investigations of direct interest to fish culture under the direction of Dr. H. S. Davis, in charge, aquicultural investigations, have been extended during the past year. Studies under the general projects of pond-fish culture and trout culture have been continued and have developed normally, producing additional results of practical value. Experimental propagation of largemouth and smallmouth black bass, crappie, and bluegill sunfishes was continued at Fairport, Iowa, and theoretical limnological studies in both laboratory and field were conducted.

A brief survey of stream conditions in southeastern Nebraska was made, and field experiments on increased fish production in the Upper Mississippi Wild Life and Fish Refuge have resulted in a comprehensive program of fish culture in that area.

Feeding and breeding experiments on trout were continued at the Pittsford (Vt.) station, and stocking experiments with black-spotted trout and Montana grayling were undertaken in the vicinity of the station. Studies of the diseases of fish, particularly trout, were continued, and an additional project embracing a study of the epidemic of sea herring in Maine was undertaken.

POND-FISH CULTURE

Investigations at the Fairport (Iowa) station were carried on under the immediate direction of Dr. A. H. Wiebe. This station serves as headquarters for investigations relating to pond culture, and it is the intention to conduct the more fundamental investigations here where adequate laboratory facilities are available. The facilities for pond work have been greatly increased during the past summer by the construction of additional ponds with a total area of about 8 acres. Several of the old ponds have been repaired or remodeled and a number of additional concrete pools built for experimental work on the effect of fertilizers. Well water is now available for several of the smaller ponds which will materially increase their value for experimental work.

Propagation of black bass.—The season of 1930 was a very successful one, the number of fish produced being much larger than in any previous year. The methods used in the propagation of bass were much the same as last year with some modifications in details which have been adopted as the result of experience. Golden shiners (*Notemigonus crysoleucas*) were used for forage fish, the ponds being stocked with adults early in the season at the rate of about 800 fish per acre. Approximately the same number of shiners were used in both brood and nursery ponds but those placed in the brood ponds averaged considerably larger.

During the spring and early summer most of the ponds were fertilized with a mixture of equal parts superphosphate and dry sheep manure. A small amount of the mixture was applied every 10 days, the total for the season being at the rate of 600 pounds per acre.

Three ponds were used as brood ponds, most of the fry being removed to nursery ponds shortly after they rose from the nests. Pond D 5, stocked with 7 male and 17 female largemouth bass, produced an average of approximately 8,000 fry to each female. These are the oldest bass at the station and average about 2 pounds in weight.

All new additions to the brood stock consist of fish which have been reared in the hatchery ponds. That such fish are equal if not superior to wild fish for this purpose is shown by the production of fry in pond D 9, which was stocked with forty-four 4-year-old fish (13 males, 21 females) that had been reared at the station. Although these fish weighed slightly less than a pound, the average production of fry was 7,134 per female.

The total production of largemouth fingerlings during the season of 1930 was 76,400, an average of approximately 9,670 per acre. Several ponds averaged over 10,000 fingerlings per acre and in one pond, slightly over ½ acre in area, the production was at the rate of 24,339 per acre. This pond was heavily overstocked with fry; and the fingerlings when removed were considerably smaller than those from the other ponds, indicating a deficiency of food. It is probable that not over 10,000 to 15,000 fingerlings per acre can be reared successfully without resorting to artificial feeding.

For the past three years a small stock of adult smallmouth bass has been maintained at the station. In view of the fact that conditions here are quite different from those usually thought to be essential for the successful propagation of this species, the fish have done remarkably well. A pond slightly less than 1 acre in area, which was used as a combined brood and rearing pond, showed a fingerling production of 10,615 per acre.

Propagation of crappie and bluegill sunfish.—The production of fingerling crappie was relatively small, since only two small ponds were available for these fish. One pond stocked with crappie and blackhead minnows for forage produced 3,108 two-inch fingerlings, which was at the rate of 13,861 per acre. In another pond (D 2) which was stocked with adult crappie and bluegill sunfish the production of crappie was at the rate of 13,988 per acre. In addition, this pond produced 25,920 bluegills averaging about 1½ inches in length. This was at the rate of 92,800 per acre. The total production of crappie and bluegill sunfish was approximately 106,000 fingerlings per acre. The results from this pond are in accord with those of previous years in indicating that crappie and bluegills make a very satisfactory combination, which works out to the mutual advantage of both species.

Cooperative experiments.—In accordance with our program of cooperative experiments at several hatcheries in different localities, arrangements have been made to operate several ponds at the Tupelo (Miss.) station on an experimental basis. During the season of 1931 these ponds will be stocked with bass and fertilized in the same way as at Fairport. Conditions at the Tupelo station are very different from those at Fairport, and these experiments will enable us to determine if the methods developed at Fairport will be equally successful at southern stations or whether they will require considerable modification.

LIMNOLOGICAL INVESTIGATIONS

Some preliminary observations by Doctor Wiebe during the summers of 1928 and 1929 indicated that the changes in the amount of dissolved oxygen and alkalinity that occur in a pond within a 24-hour period may be as large, if not larger, than the seasonal changes when the observations are taken regularly at the same time each day. For this reason it was decided to make a series of tests to determine the extent in the diurnal variations in dissolved oxygen, alkalinity, and in some instances ammonia nitrogen. These observations show that very marked changes in the actual amount of dissolved oxygen and in phenolphthalein alkalinity may occur within 24 hours and that the extent of these variations are determined by the abundance of the algæ. It appears that the algæ can utilize all of the CO_2 present as bicarbonate as well as some of the CO_2 of the normal carbonate.

A brief survey of the Blue River system in Nebraska was undertaken by Dr. A. H. Wiebe and H. L. Canfield during July, 1930. The purpose of the survey was to determine what species of game fish might be successfully introduced into the streams that constitute the river system. The streams were found to be adapted to both species of black bass and to the bluegill sunfish, although none of these fish are found in the Blue River or its tributaries at the present time. The principal fish taken during the survey were the channel catfish, white crappie, green sunfish, carp, buffalo, and bullheads.

UPPER MISSISSIPPI WILD LIFE AND FISH REFUGE

The work in the Upper Mississippi Wild Life and Fish Refuge was continued along the same lines as in 1929 under the immediate direction of E. W. Surber. Detailed quantitative biological studies of five sloughs in the bottoms of the Mississippi River which were begun in the spring of 1929 were continued during the winter and summer of 1930. Collections of the plankton and of the bottom and weed-dwelling organisms were made at 2-week intervals throughout this time. At the same time determinations were made of the chemical conditions.

The observations revealed that the sloughs differ widely in the production of natural food, that the bottom and weed populations are apparently composed of few species but large numbers of individuals, and that the character of the bottom of a slough can be used in predicting the quantity and density of the food it contains. Gas analyses of samples taken in winter beneath the ice showed that the oxygen supply of the sloughs investigated was exhausted by the end of January. For this reason it will be impossible to hold fish in the sloughs during the winter and holding ponds for the brood fish must be provided elsewhere. Complete analysis of the data accumulated in these studies will not be possible for several months.

FIGURE 8.—Limnological investigations in the sloughs of the Upper Mississippi Wild Life and Fish Refuge

A few of the sloughs have no direct connection with the river, but the great majority have one or more natural channels which connect with the river except at low stages. These channels must be closed by screens when the sloughs are used for the propagation of bass or other game fishes. It is also necessary to remove the larger aquatic plants and the bushes lining the shore so that the entire slough can be seined.

The first serious attempt to propagate largemouth bass in the sloughs was made during the season of 1930. A number of sloughs, which had been selected for the purpose, were cleared; and screens constructed across any connection with the river. After the enemy fish had been removed the sloughs were stocked with forage minnows and later with bass fry. Unfortunately shortly after the sloughs were stocked with bass there was an unusually high June flood, which rose above the screens and allowed the fish to escape. This occurred in five of the eight sloughs which had been stocked. The remaining three sloughs all showed a good production of fingerling bass.

One slough with an area of approximately 4 acres was stocked with 20,800 bass fry on June 15. When seined September 15–17, there were 10,538 fingerlings removed, a survival of approximately 50 per cent. Another slough known as pond No. 2 with an area of 1.5 acres was stocked with 5,180 fry on June 22. The slough was seined September 19, and 3,691 fry averaging 4⅜ inches long were recovered. This is a survival of approximately 71 per cent which is by far the highest rate of survival obtained in any of our experimental work. The third slough, area 1.3 acres, was used as a brood pond so the number of fry in the pond is unknown. This pond was seined August 20–22 and 11,422 fingerlings removed. This is at the rate of 8,786 fingerlings per acre which compares favorably with the production obtained in the ponds at Fairport.

Although on account of the unusual flood conditions the total production of bass fingerlings fell short of expectations, it is evident that in ordinary seasons these sloughs can be made to produce fully as many fish as the average hatchery pond.

Since the control of aquatic vegetation is essential to the successful utilization of the sloughs for the production of game fish, considerable attention has been devoted to this problem. Experiments with a sodium arsenite weed killer by Mr. Surber indicate that treatment of the fishponds with this chemical may furnish a solution of the problem. From the fish-cultural standpoint this chemical has a great advantage over copper sulphate, which has been used to some extent for this purpose, in that it affects the algæ less than the higher plants and is not nearly so toxic to fish.

In the experimental work in the sloughs used as fishponds, dilutions varying from 1 to 1.7 parts per million—depending on the density of the vegetation—of arsenious oxide have been used with success. It was found that the treatment did not directly destroy the abunuant plankton organisms, either plant or animal. Furthermore, no serious effects have been produced on the abundance of bottom organisms and Entomostraca except in some instances where the numbers of organisms dependent on the larger aquatic plants have been reduced as was to be expected. No evidence was obtained in these experiments that concentrations of arsenious oxide up to 3.5 parts per million were toxic to fish in the slightest degree. The only mortality that occurred was caused by lack of oxygen which, of course, can be avoided by beginning the treatment in the spring before the vegetation has become unduly abundant.

Experiments at the Fairport station by Dr. A. H. Wiebe have shown that bass, bluegills, and crappie are not appreciably affected in aquaria by concentrations of As_2O_3 as high as 7 parts per million. It is evident, therefore, that there is no danger of the fish being seriously injured by the sodium arsenite treatment. Experiments are now being made to determine the effect of arsenic on some of the more common food organisms of fish.

In preparation for the experiments during the summer of 1931, a large stock of brood bass has been accumulated and is being held over the winter in a spring-fed pond at Trempealeau, Wis. In the spring these fish will be transferred to suitable ponds in which they will be allowed to spawn, and the resulting fry will be used for stocking sloughs which have been put in readiness to receive them.

TROUT CULTURE

Investigations relating to trout culture were carried on at the Pittsford (Vt.) station under the immediate supervision of Russell F. Lord. As in previous years, these investigations included feeding experiments with various rations and a systematic plan of selective breeding. Studies of the food and movements of trout in Vermont streams were also made, and it is planned to increase the scope of these investigations in the near future.

A number of additional rearing ponds were constructed during the year which will considerably increase the capacity of the station. The available supply of spring water is now being utilized to its full capacity, and, for this reason, no further increase in the number of rearing ponds will be possible.

Feeding experiments.—The feeding experiments during the summer of 1930 were conducted almost entirely with fingerling brook trout. Owing to heavy losses among the yearling trout from furunculosis during the previous winter, only a few fish of this age were available for experimental work. As in previous years, each lot containing 1,500 fingerlings occupied an entire hatchery trough through the summer. The fish were carried on experimental diets from April 16 to September 3, inclusive.

With very few exceptions the fish made a more rapid growth than in previous years on comparable diets and the mortality was relatively low. This was probably largely due to the fact that the fish used in the experiments were from eggs produced at the station from selected stock. In previous experiments the fish were hatched from eggs obtained from outside sources.

The most striking feature of the experiments was the results obtained with the use of dried salmon eggs. These when ground into a fine meal make an excellent trout food, although, like all dry foods, they should always be fed in combination with fresh meat. In comparison with the controls fed straight beef liver the fish on a ration composed of equal parts beef liver and dry salmon eggs averaged one-third larger and the mortality was considerably less. The fish fed salmon eggs were exceptionally lively and vigorous and showed the brilliant coloration of wild trout of the same age. This latter character is a very striking one, the pink fins and iridescent sides appearing in marked contrast to the dull colors of fish on other diets.

As would naturally be expected, yearlings on a salmon-egg ration developed even brighter colors than the fingerlings. After being kept on such a diet for several weeks they could not be distinguished from wild fish.

The bright colors of fish fed a salmon-egg ration opens up great possibilities. A number of States have adopted the policy of rearing all trout to legal size before they are liberated, and there is no doubt that this practice will soon be followed in other sections. The most serious drawback to this practice is the fact that hatchery-fed fish invariably have a much duller coloration than wild fish and, therefore, can be readily recognized by the discriminating angler. This difficulty can be eliminated by feeding the fish a ration rich in salmon eggs for a short time before they are to be distributed. Not only do they quickly assume the bright colors of wild fish but they also show remarkable vigor and resistance to disease. It thus becomes possible to artificially rear fish that are indistinguishable from those which have spent their lives in open waters.

Steam-dried menhaden meal also gave good results when fed in combination with beef liver and was found to be superior to the flame-dried product. It is becoming increasingly evident in these experiments that properly prepared fish meals and dried milks form a valuable addition to the diet of trout. Not only do the fish do fully as well, or even better than on a straight meat diet, but there is also a considerable saving in the cost of the food. At current prices the cost of the food required to raise trout to a certain size on a diet containing a large percentage of dry salmon eggs or menhaden meal is about 40 per cent less than when they are fed straight beef liver.

A set of experiments was also run to determine the relative value of pig melts as a trout food. Owing to its low price this product is being fed in considerable quantities at a number of hatcheries. It was found that pig melts, either alone or in combination with other meals, are considerably inferior to beef liver as a growth producer but are superior to beef melts which are also fed at some hatcheries.

The experiments showed that in general the rations which produced the most rapid growth were also the most economical even though the actual cost of the ration might be somewhat higher than that of the poorer rations. This is due to the fact that with the poorer rations a larger amount of food is required to produce an equal amount of fish flesh. For instance, with the salmon egg rations about 3 pounds of food were required to produce 1 pound of fish, with straight beef liver about 4 pounds of food were required to produce the same amount of fish, while the pig melts it was necessary to feed approximately 6 pounds of meat to produce the same result.

Breeding experiments.—The work in selective breeding was continued along the same lines as in previous years. Each season a number of select fish are mated and the progeny of each pair reared separately during the following summer. In selecting these fish special emphasis is placed on rapid growth, vigor, fecundity, body symmetry, and coloration. Since it is obviously impossible to rear the progeny of each pair to maturity separately only the young which excel in the characteristics noted above are retained for experiment during the second season. In this way it is the confident expectation that within a few years a stock of exceptionally vigorous and rapidly growing fish will be built up.

During the fall of 1930 eggs were taken from 45 pairs of selected fish, and the young are now being held in separate compartments under as nearly identical conditions as possible. In accordance with the program outlined above the inferior lots will be discarded later in the season.

While the breeding work is still in its infancy it is already evident that the results will be of great practical value. Probably the most notable result up to the present time is the demonstration that the time at which trout spawn is determined primarily by heredity, although evidently influenced to some extent by environmental conditions. At the Pittsford station there are several strains of trout from different sources and these all showed marked difference in the date on which they are ready to spawn. This was shown in a striking manner in one pond containing two strains of brook trout. When examined on October 28 practically all of the fish of one strain were ready to spawn while the other strain showed no indications of being ripe.

Moreover, it appears that the relative time of spawning is constant from year to year. The earliest fish to spawn in 1929 were also the first to spawn in 1930. In 1929 the eggs were taken on October 29 while in the following year the fish were ready to spawn on October 25. The advance in the spawning date in 1930 is in accord with the general belief that older fish usually spawn somewhat earlier than those spawning for the first time.

Another indication that the spawning date is determined primarily by heredity is the fact that all of the progeny of a single pair of fish are usually ready to spawn at approximately the same time. This is in striking contrast to the condition in mixed lots where the spawning period almost invariably extends over several weeks.

It is evident that this is a matter of considerable practical importance since it is possible by selection to develop a strain of fish with a short spawning season which will result in a considerable saving in labor. It will also be possible to develop early or late spawning strains as desired. Furthermore, the eggs should be of better quality, since there is considerable evidence that fish which have been closely confined for some time produce inferior eggs.

Stocking experiments.—During the summer and fall of 1930 plantings of fingerling black-spotted trout and Montana graylings were made in several streams in Vermont in order to determine if these two species will thrive in eastern waters. Contrary to the general belief it has been found, as pointed out in previous reports, that both the black-spotted trout and the grayling do well at the Pittsford hatchery so it is evident that the climatic conditions are favorable for both species. The black-spotted trout occurs naturally under a wide range of conditions in the West, and it is not impossible that they may be found better adapted to certain eastern waters than the native brook trout.

During the past two years several hundred rainbow and steelhead trout have been tagged and liberated in Vermont streams. These were all adult fish which had been reared at the Pittsford station. So far only a small percentage of the tags have been accounted for, but enough have been returned to indicate that the fish have lived up to their reputation as having a much more roving disposition than the brook trout.

FISH DISEASES

Herring disease.—During July, 1930, Dr. H. S. Davis in company with the State inspector and officials of the Federal Food and Drug Administration visited some of the more important fishing centers on the coast of Maine in an effort to obtain first-hand information regarding the so-called herring disease. This disease first became prevalent in 1929 and has been the cause of considerable anxiety to the herring and sardine industry since that time.

It was found that the disease was apparently fully as prevalent in 1930 as during the previous summer, although at the time it appeared to be declining in severity. Later in the season, however, conditions again became worse; and, at the urgent request of the sardine packers, the bureau has undertaken a thorough investigation of the disease. This investigation is being conducted in cooperation with the State of Maine, which is defraying most of the expenses. A laboratory has been established at Eastport, Me., and provided with the necessary equipment for investigating all phases of the disease. A sardine boat has been chartered by the State, and this will enable the investigators to visit the weirs in the vicinity of Eastport and collect their own fish if necessary.

George E. Daniel with the assistance of several of the State sardine inspectors is now actively engaged in a study of the disease. He will be joined later in the season by Frederic F. Fish.

The disease is evidently due to a microorganism belonging to the obscure genus known as Ichthyosporidium or Ichthyophonus. Although several different parasites belonging to the genus have been described, practically nothing is known regarding the organisms or their life history. Even the affinities of the genus are very uncertain. The parasites were originally thought to belong to the Haplosporidia, a group of protozoa, but it now appears more probable that they are in reality more closely related to some of the lower fungi (Chytridiniæ). The appearance of the parasites in the herring support the latter theory.

The parasite occurs in all parts of the body but is especially abundant in the muscles and liver. The development of the parasite is apparently not affected by seasonal changes since the appearance of the diseased fish is identical whether taken during the winter or in the summer. Furthermore, preliminary studies at Eastport indicate that fully as large a percentage of the fish taken in winter are infected as during the summer.

Trout diseases.—Studies on furunculosis and the gill disease have been continued by Doctor Davis at the Pittsford station. A severe outbreak of furunculosis provided an opportunity for additional studies on this disease, which, everything considered, is probably the most serious infection known to occur in trout. Particular attention was paid to the pathology of the disease, which previously had received relatively little attention from investigators. Furunculosis has appeared at several of the bureau's hatcheries during the last year or two, and it is evident that the disease is yearly becoming more prevalent. Unless great precautions are taken to prevent its spread, it will soon become as common as in Europe.

OYSTER INVESTIGATIONS

Oyster investigations during 1930 were continued under the direction of Dr. Paul S. Galtsoff along the following lines of research: Experimental studies in oyster culture, studies of the causes of the decline of the oyster industry and of the mortality of oysters, analysis of the oyster bottoms, and development of the methods of controlling the enemies of the oyster.

Field and laboratory research work was carried out both along the Atlantic and the Pacific coasts of the United States and, at the request of the Territorial government of Hawaii, was extended to the Hawaiian Archipelago.

SETTING, METAMORPHOSIS, AND DISTRIBUTION OF OYSTERS

During the past summer the investigations of the physical, chemical, and cytological aspects of the setting of the oyster have been completed by H. F. Prytherch. These studies have shown that copper is the specific factor of greatest importance in the attachment, survival, and distribution of this marine organism. Copper is brought down to the inshore coastal areas either by the rivers or by the flow from underground channels and examination of several fresh-water streams in Connecticut has shown that it is present in these waters in amounts varying from 0.1 to 1.5 parts per million and is present in greatest amounts after periods of heavy precipitation.

Since the setting of the oyster larva may be induced by solutions containing as little as 1 part copper to 50,000,000 parts of sea water, it is not surprising to find that there is a definite relation between the distribution of oyster beds and prolific seed producing areas, and the flow of fresh water containing copper into these coastal regions. In Milford Harbor, Conn., setting takes place at low slack water when copper was found to be present in amounts varying from 0.1 to 0.6 part per million and did not occur at other stages of the tide when it was impossible to find measurable amounts of this metal. Traces of copper were found to be necessary also for the metamorphosis of the larva into a spat and this served to bring about the breaking up of the pigment spots and the release of numerous deeply colored cells of which they are formed. In the absence of copper the attached larva failed to metamorphose or grow and lived for a period of 8 to 14 days. Those receiving copper stimulation after attachment became transformed into spat in a few hours and grew rapidly under the same conditions as those used for the retarded individuals.

The salinity of the water was found to have a pronounced effect upon the velocity of the setting reaction or length of time required for attachment. The optimum condition for setting was found to be in salinities from 15 to 20 parts per thousand, while above or below this salt concentration the reaction was gradually retarded and finally required several hours for completion in salinities above 30 or below 5 parts per thousand.

The beneficial and stimulative value of minute amounts of copper must not, however, be construed to indicate that trade wastes containing this metal are helpful in this respect for a great amount of the metal had a poisonous effect on the larvæ and caused death in a very short time. Trade wastes of an alkaline nature are also found to be detrimental as they precipitate from the river water its normal content of copper and thus deprive the oyster of an essential element for setting and transformation into the adult stage.

Experiments with the partition type of seed-oyster collector.—Experiments carried out in Connecticut by Mr. Prytherch in cooperation with the Bluepoints Co., Connecticut Oyster Farms Co., and F. Mansfield Oyster Co., have shown conclusively that the cement-coated partition is a practical and efficient device for collecting and transplanting heavy crops of seed oysters. In Milford Harbor over 20,000,000 seed oysters were collected on approximately 5 acres of bottom by the 7,000 partitions planted there by Capt. C. E. Wheeler of the Connecticut Oyster Farms Co. On this same acreage the setting was sufficiently heavy to warrant a planting of ten times as many partitions, which would easily have collected 50,000,000 more seed oysters that were lost as a result of overcrowding and lack of room for growth. For example, it was found by actual count that from 8,000 to 12,000 spat were attached per single partition on August 20 and that by the middle of September this number had been reduced to approximately 4,000 to 6,000 as a result of overcrowding. The shells and gravel over which the partitions were planted were also totally covered with spat so that the partitions actually saved millions of seed which would otherwise have been lost.

Several of the partitions were weighed when the spat were only a few days old and also when they were 2 months old and ready to be transplanted. During this interval the weight of a single partition increased on the average from 2 to 2½ pounds, which shows that approximately 7 tons of oyster seed were collected and grown on the 7,000 partitions. Similar results were obtained by the Bluepoints Co., with a schooner load of 13,000 partitions, which were brought over from Great South Bay, Long Island, and planted in Long Island Sound off Bridgeport. There was no evidence that a set would occur in the former region; and since predictions had been issued for a heavy set in Connecticut, it was deemed advisable to move the collectors to the more promising region. On the advice of the bureau the shipment was rushed and planted just in time to catch one of the heaviest sets of oysters that has occurred in Connecticut in recent years. In New Haven Harbor the 5,000 partitions which were planted under various conditions by Howard W. Beach of the F. Mansfield Oyster Co. collected approximately 10,000,000 seed oysters in addition to those on the shells over which the partitions were planted.

The partitions used during the past summer were greatly improved by making them according to the pattern used in cardboard fillers for duck eggs. With this design the compartments were much larger and deeper and allowed greater room for growth of the oyster spat. Each partition consisted of 12 interlocking strips, 11½ by 2½ by 3½ inches, which when coated with a mixture of cement, lime, and sand, presented a total surface of approximately 690 square inches. In coating the partitions, various mixtures were tested, the most suitable being found to consist of the proportions of two sacks of sand, one sack of cement, and one-fourth to one-half sack of slacked lime.

When the seed oysters on the partitions had reached an age of 1½ to 2 months, they were transplanted from the shallow inshore areas to the deeper waters of Long Island Sound. It was found that the partitions could be easily broken apart and the seed oysters separated by simply forcing the collector together by pressure across any two diagonally opposite corners. This required but a single operation which detached a large number of the seed and broke up the partition into 60 small squares, 2 by 3 inches. The oysters on many of these squares were kept under observation and were found as they grew larger to gradually break apart and separate as single individuals. After the partitions are broken up into squares, the seed oysters can be easily shoveled back on deck in a pile and then thrown overboard on suitable growing grounds.

PROTOZOAN PARASITE OF OYSTER GILLS

Many oysters from Milford Harbor, Conn., were found to have decidedly undersized gills with frayed, ragged edges, which indicated that they were being injured, or had recently recovered from damage, by some unknown agency. A cytological study of these specimens by Mr. Prytherch at the University of Pennsylvania showed that the gill tissue had been invaded by ciliate protozoa, which attacked the delicate, nonciliated cells lining the water tubes and epibranchial cavities. In these cells the protozoa were found to be reproducing rapidly and destroying this thin layer of tissue which separates the blood vessels of the gills from the sea water that continually passes over it. The portion of the gill in which the parasites were found is supposed to function in the oxygeneration of the blood so that injury in this region would not only affect the respiration of the oyster, but would also indirectly bring about destruction of the ciliated cells and gill filaments by disrupting their blood supply. The parasite is a ciliate protozoan of the order Heterotrichida, and varies in length from 8 to 10 microns at the time of first invasion to 15 to 25 microns when full grown. It was found to be present in the gills of spat only 1 month old and in adult oysters of various ages. In a few oysters over 50 per cent of the gill tissue had been destroyed, so it is evident that this parasite may easily interfere with the respiration, retard growth or cause death of the oyster.

CAUSES OF OYSTER MORTALITY IN VIRGINIA

During the winter of 1929–30 the oyster planters of Virginia, particularly those in Mobjack Bay and York River, suffered from some unknown cause a heavy loss of their stock, amounting to over one-half million dollars.

As a result of this high mortality of oysters and a decline of over 3,000,000 bushels in the annual production from 1904 to 1927, the State of Virginia requested the U. S. Bureau of Fisheries to undertake an investigation of this valuable sea food resource.

In response to this request a cooperative investigation was begun by H. F. Prytherch and W. H. Dumont of the Federal Government on May 12, 1930, for the purpose of determining: First, the cause of the mortality of oysters during the previous winter; and second, the most suitable means for restoring and increasing their production. In carrying out its program, the bureau has received excellent cooperation from the department and officials of the Commission of Fisheries of Virginia, from the department of biology, William and Mary College, and from the State health department. The investigators are particularly indebted to Capt. John B. Bush of the *Katie* for information regarding local conditions and assistance in the experimental work.

Though the investigation is still in progress, it was deemed advisable to issue a brief summary of the work performed and the results which have been obtained up to the present time (January 15, 1931).

Since the greatest loss of oysters occurred in Mobjack Bay and vicinity, this phase of the investigation has been concentrated chiefly in that region. A temporary field laboratory was established at Yorktown and cruises made at regular intervals with the State boat *Katie* to various stations in Mobjack Bay and York River.

Experiments were made also in the James and York Rivers for the purpose of determining a practical policy for rehabilitation of the oyster resources.

During this phase of the investigation particular attention was paid to the oxygen content of the water in Mobjack Bay as a deficiency of oxygen has been responsible for the destruction of oysters in other regions. In the lower layers of water in this bay the oxygen content varied during the summer from 1.1 parts per million to 4.9 parts per million, while at the surface it was always from 2 to 5 parts higher. The soft mud bottom was found to contain from 50 to 120 parts per million of hydrogen sulphide, which reduced the oxygen content of the water to zero whenever stirring up of the bottom occurred. Large numbers of oysters were not only partly buried in this mud, but previous to their death were subjected to the continual settling of clouds of mud upon them as extensive dredging operations were in progress.

Precipitation and river discharge in tidewater Virginia were higher than usual in October and November, 1929, so that the oyster beds received a considerable deposit of sediment, eelgrass, and débris, which would further reduce the oxygen in the lower layers of water. The high mortality of oysters in Mobjack Bay may easily have been brought about by the combined effect of the following circumstances; namely, (1) unusually heavy planting of oysters in this region, (2) deficency of oxygen supply because of overcrowding of oysters and of sedimentation, stirring, and resettling of mud bottom by dredging operations, (3) direct poisonous effect of hydrogen sulphide and other toxic products of decomposition, (4) previous weakened and diseased condition of the muscles of the oysters from causes at present under investigation.

This latter factor is perhaps of greatest fundamental importance in the recent mortality since the studies show that there existed a pathological condition of the muscle tissue in oysters from several different localities, but that death of the oysters occurred chiefly on the areas where bottom conditions were least favorable. Since the muscle of the oyster requires a greater oxygen supply than any other tissue, it is apparent that the oysters on poor bottom would be the first to weaken and die because of an insufficient amount of oxygen for normal functioning of the muscle and closure of the shell.

EFFECT OF WASTE PULP-MILL LIQUOR ON THE OYSTERS

A study was made by Dr. A. E. Hopkins of the effect of waste liquor from a sulphite pulp mill on the Olympia oyster. Experiments carried out at the temporary laboratory established by the bureau near Olympia, Wash., demonstrated that the waste liquor was highly toxic to oysters in concentrations as low as 1 part to 2,000 parts water. All oysters treated with these solutions for a sufficient length of time either died within about 30 days, or did not remain open to feed as much of the time as did control specimens in presumably uncontaminated sea water. The death time of oysters in solutions of sulphite liquor varied in an inverse manner with the concentration. Specimens which reacted to the liquor by remaining closed a large portion of the time were able to live longer in the solutions than oysters which remained open during most of the period of treatment. In no case was new shell growth observed in oysters in liquor solutions, although control specimens showed considerable new growth. These effects were not due to acidity of the liquor for they were observed as well when neutralized liquor was employed.

Kymograph records of the shell movements of Olympia oysters at different temperatures were found to show a striking effect of changes in temperature on the relative length of time the shells remain open. Since feeding can occur only when the shells are open, the significance of these observations is obvious. In the laboratory the water showed an average diurnal fluctuation of about 2° C. between the minimum (about 6 a. m.) and the maximum (3 to 4 p. m.). At low temperatures, 4° to 7° C., this fluctuation produced a great difference in shell movements, while at higher temperatures, 14° to 17° C., the same temperature change caused almost no change. While at low temperatures a small drop in temperature causes the oyster to close, at high temperatures the same drop is almost without effect. A report on this work will be published in the near future.

Experiments have been made to determine the relative sensory effect on the oyster of certain salts which are in solution in sea water. The oyster is highly sensitive to these salts and can detect them in very dilute concentrations, as shown by the retraction of the tentacles and contraction of the adductor muscle, which closes the shells. The order of stimulating efficiency of the ions is as follows: Cations, K, NH_4, Na, Li; anions, I, Br, NO_3, Cl. A report on these observations is in press.

Field work on the investigation of oyster mortality near Shelton, Wash., conducted by H. C. McMillin was completed early in January. It was found that the death rate of oysters in Oakland Bay was very high. On the lower ground only occasional oysters were left, while on the higher ground the living ones were very poor. No marketable oysters remained on the beds. The green-colored, clear water normally found over the oyster beds had been changed to a coffee-brown color which was quite opaque. This change took place subsequent to the beginning of operations by the pulp mill at Shelton, Wash. It was found that Oakland Bay contained about 26,000 acre-feet of water of which an average of 200 acre-feet was renewed each day by tidal action. The pulp mill operation acknowledges the dumping of 70,000 gallons of sulphite liquor into the bay beside certain wash waters. It is possible to calculate the concentration of sulphite liquor in the bay at any time from a mathematical formula taking into account the proportion of liquor to sea water, the number of acre-feet of liquor discharged into Oakland Bay by the mill per day, the number of acre-feet of new sea water brought in by tidal action each day, the volume of the bay in acre-feet, and the time in days. By this formula the equilibrium concentration may be calculated when a given amount of sulphite liquor is added each day. The discharge of 70,000 gallons per day at the mill would bring about a concentration of 1 part of liquor to 930 of water in Oakland Bay, which concentration, laboratory experiments showed, would seriously affect oysters. The State fishery inspectors show in their reports that several times as much liquor was discharged at the mill as was used in these calculations.

During June and July experiments were conducted on the spawning of the native oysters. It was found that the larvæ were discharged from the mantle cavity of the parent when they were taken into the laboratory or handled in any way, unless great precaution was used. This discharge took place regardless of the stage of development of the larvæ and suggests that seed-moving operations of the oyster growers should be completed before the oysters "come into spawn."

Efforts to rear larvæ in aerated tanks were not successful. The young lived and grew, but they maintained a symmetrical shape and did not set within the normally expected time. In the mantle cavity of the mother, development took place normally in the laboratory. Under constant temperature conditions the incubation period was reduced from 14 days to 6 days.

ANALYSIS OF OYSTER BOTTOMS

A mechanical analysis of some oyster bottoms of Georgia was made by W. H. Dumont to ascertain if there is any correlation between the grain size of the particles and the consistency of the bottom. It was found that no relation existed between the amount of clay or sand and the degree of softness. This was especially shown in two samples taken within 20 feet of each other in Georgia in March—one was a hard gray clay while the other was a soft brown mud. A mechanical analysis by the pipette method showed the grain sizes of both to be nearly identical. The only differences found were a higher organic content and faster rate of settling of the particles of the hard clay sample.

At the request of the Bureau of Fisheries the Bureau of Public Roads made several additional tests, but was unable to find any differences between the two samples. The Petrological Laboratory of the Geological Survey examined them and found that the part designated as clay was composed mainly of diatoms, which were evenly distributed in both samples.

A further study is planned on the consistency of bottoms and the degree of hardness necessary for the planting of oysters.

CONTROL OF STARFISH ON OYSTER BEDS

A study of the biology of the starfish with the view of finding a practical method of eliminating from oyster beds this animal, which is so destructive to oysters, was made by Louise Palmer at Cold Springs Laboratory, Long Island. Oyster growers in Long Island Sound spend thousands of dollars each year in fighting this serious pest, for starfish devour countless numbers of oysters throughout their whole life history from the time the larvæ set on the shells until the mature oyster is marketed. Young starfish no larger than a pinhead eat many of the newly set oysters, termed spat, during a 24-hour period, while large starfish take several hours to open and consume the adult oyster, 2 or 3 years old. One grower in Long Island Sound kept accurate records of the amount of starfish caught on his beds in one year. In 1929, he removed 650 tons from Naragansett Bay. This not only meant a loss of hundreds of dollars in an effort to destroy these pests but an incalculable loss due to the number of oysters already destroyed.

In 1889 Doctor Meade, now of Brown University, working for the U. S. Bureau of Fisheries, studied the habits of the starfish in order to discover some angle of attack for extermination. Since that time no effort has been made to learn the natural history of starfish in different regions or to study their ecology and physiology with the purpose of control.

Since mechanical control of starfish as now practiced is expensive, time consuming, and effective only in limited areas, an attempt was made during the summers of 1929 and 1930 to find some chemical means which would be effective and practical on the beds for their eradication. Many chemicals were tried, but copper sulphate was the only substance found to be effective in minute amounts and at the same time worth practical consideration. During the past summer tests were made to determine the effectiveness of this salt on the starfish, the oyster, and other marine forms.

Large starfish were more resistant to copper sulphate than small ones. Starfish of all sizes were killed by exposure of 12 to 15 minutes to concentrations of 100 parts of copper sulphate to 1,000,000 parts of water, the larger ones requiring the longer exposure and so on until the smallest tested were killed with 4 minutes' exposure. The time of exposure is inversely proportional to the concentration, 15 seconds' exposure being sufficient for death in concentrations of 1,000 parts per million. The minute starfish are killed by concentrations of 10 parts per million but this concentration is ineffective for large starfish except for impractically long exposures.

The effect of the copper sulphate is dependent on salinity, hydrogen-ion concentration, and temperature. A chemical reaction occurs between the copper from the sulphate and the carbonate in the sea water so that in more saline waters a greater percentage of the copper is precipitated out as insoluble carbonates and hydroxides. Less soluble copper is available for toxic action, therefore longer exposures are necessary for death in the more saline water. Higher hydrogen-ion concentration tends to release the carbonates and keep the copper in solution so that less exposure is necessary for death. As the temperature increases the toxic action increases to such a degree as to lead to the conclusion that chemical rather than physiological factors have resulted in death to the organism.

Consideration was given to the effect of copper sulphate on other marine forms, particularly the oyster. Two parts per million of copper sulphate cause the valves to close and remain so for 30 or more minutes, while strong concentrations such as 1,000 parts per million cause the oyster to remain closed for several hours. Young oysters have a greater tendency to open in the presence of copper sulphate than the older oysters and consequently are more likely to be killed. However, the danger from the poison is unimportant in comparison with the total extermination of a given crop which is probable when starfish are present.

PEARL OYSTERS IN HAWAIIAN ISLANDS

In 1928 the Territorial government of Hawaii requested that an investigation be made of the pearl-oyster beds discovered in 1927 in Pearl and Hermes Reef, a small lagoon located about 1,100 miles in a west-northwestern direction from Honolulu. Because of a lack of funds the project could not materialize until the Navy Department consented to loan a vessel for the purpose, and the Territorial government appropriated a small sum to cover part of the expense.

On July 15, 1930, Dr. Paul S. Galtsoff, in charge of the expedition, sailed aboard the U. S. S. *Whippoorwill* from Pearl Harbor, Hawaii, and arrived at Pearl and Hermes Reef on July 19, 1930. The ship was anchored outside the lagoon about 13 miles from the southeast island where headquarters were established. Pearl and Hermes Lagoon is an atoll about 18 miles long and 12 miles wide, and is partially surrounded by a narrow strip of coral reefs which embrace it on the east, south, and southwest, leaving the northern and northwestern sides unprotected. A series of islands, most of them merely sand bars, extends from the northeastern corner along the eastern and southern sides of the lagoon. The lagoon itself comprises a maze of small reefs and channels, with the depth of water varying from a few inches to 104 feet, and the reefs growing inside the lagoon are made up by a fingerlike coral "porites." The flat tops of the reefs are covered with very soft sand and old broken corals, while live corals grow on the very steep slopes of the reefs. Pearl oysters are found almost exclusively among the corals on the slopes of the reefs at a depth of from 10 to 47 feet, but below that the bottom is composed of sticky coral mud unsuitable for pearl oysters.

Inasmuch as no detailed hydrographic survey of Pearl and Hermes Reef has ever been made, considerable time was spent by the expedition in mapping the area and in determining the exact position of the islands. This part of the work has been carried out by Lieut. M. M. Nelson, commanding officer of the U. S. S. *Whippoorwill*, who made astronomical observations and determined the longitude and latitude of several points on the islands. Three high signal towers built on the island were carried on the motor boat and placed in shallow water in the middle of the lagoon. They were supplied with platforms from which the location of pearl-oyster beds, marked by buoys, was determined by means of compass and range finder.

Biological observations consisted of the following: Sounding; taking of samples of bottom and water; temperature readings (top and bottom); and determinations of the alkalinity of the water, of its transparency, and of its food content. For the examination of pearl-oyster beds three divers were employed, who were directed to swim and dive for a period of time varying from half an hour to an hour and a half. Because of the irregular distribution of pearl-oyster beds the total number of the present oyster population of the lagoon could not be determined. However, from the data obtained during the investigation it is possible to determine the relative abundance of oysters; that is, the number of oysters found by the average diver during a given period of time.

Biological observations just described were carried out at 70 stations uniformly distributed over the whole area of the lagoon, and from an anaylsis of the data the following conclusions can be drawn:

Pearl oysters grow at a depth of from 10 to 47 feet, attached almost exclusively to live corals. The average weight of the adult oyster is about 2 pounds, and the maximum weight is 7 pounds, but at present those weighing over 3 pounds are rather scarce. All the oyster reefs examined in the course of the investigation show signs of depletion. On most of them, 3 divers were able to find in one hour only 3 or 4 oysters.

One-year-old oysters were almost entirely absent. This fact indicates that either oysters failed to spawn and set in 1929 or that last year's crop was destroyed by the fishermen. Because small oysters have a tendency to attach themselves to the shells of the adult ones the second explanation seems to be very probable.

Pearl oysters spawn and set in Pearl and Hermes Lagoon in July and August. There are two factors which are essential for a successful spawning: High temperature of the water (27° C.) and abundance of adult oysters on the reef. The latter factor is as important as the first one. When oysters are scarce and single individuals are scattered over the large area, the two sexes fail to stimulate each other and chances for spawning and fertilization of their eggs are very small. Thus, when because of overfishing the number of the adult oysters on the reef is reduced to a certain low limit, the oysters fail to spawn and their propagation ceases. The evidence supporting this statement is found in the fact that no young oysters (spat) were found on single individuals taken from badly depleted reefs, whereas on the reefs that were not so badly overfished the spat was abundant.

Pearl oysters of Pearl and Hermes Reef produce valuable shells (mother-of-pearl) and bear large numbers of pearls. It has been estimated that since 1927, when pearl beds were discovered, not less than 100 tons of shells (about 106,000 oysters) were taken from the reef. There is no doubt that without protection the beds will be completely wiped out in a short time.

The expedition brought back 310 live pearl oysters which were planted in Kaneohe Bay near Honolulu. It is hoped that these oysters will establish themselves in the new environment, which is suitable for their growth and propagation, and will form a nucleus of the first American pearl-oyster farm.

With the view toward conservation of the only known pearl oysters in the United States the Governor of the Territory of Hawaii has issued an order forbidding for an indefinite period of time the taking of pearl oysters from any locality within the jurisdiction of the Territorial government.

INVESTIGATIONS OF MUSSELS AND POLLUTION IN INTERIOR WATERS

The Columbia field unit, with a working staff of 11 under the direction of Dr. M. M. Ellis, is housed in a suite of eight rooms in the new section of the Medical Building of the University of Missouri. These rooms have been especially equipped by the University of Missouri to meet the needs of fishery research, and the unit is recognized by the University of Missouri as an adjunct to its graduate school.

FRESH-WATER MUSSELS

Glochidia and breeding stock.—Through the cooperation of the button manufacturers and various State officials over 6,000 gravid female mussels were examined by this unit during the past year and the condition of the glochidia studied with reference to disease, stream pollution, and utilization for propagation purposes. This work involved the handling of several thousand additional mussels, as well, for correlations with age, locality, and general condition.

Few glochidia suitable for propagation work were found, and the effects of stream pollution on gravid mussels were discovered to be far-reaching and serious, rather generally throughout the Mississippi drainage. Two conditions in particular seem deserving of special mention, viz, bacterial infection and chemical poisoning.

Many marsupia, particularly from mussels collected in the Mississippi and tributaries below or near large cities, were found to have black masses filling units of the marsupium normally occupied by conglutinates of glochidia. When the masses were opened they were found to contain dead and disintegrating glochidia and to be heavily infected with bacteria. Bacteriological studies of these masses showed that in addition to the usual bacterial flora to be expected in any decomposing mass of tissue, one particular organism, similar in many respects to the well-known *Bacillus proteus*, was recovered as the principal organism from this mass. Experimental work is now in progress to determine whether this particular bacillus is of primary or secondary importance in the production of these lesions in the brood pouches of mussels. It has been noted that the glochidia in conglutinates adjacent to these black masses are less reactive than normal glochidia, often being entirely unreactive, and that this black mass spreads through the marsupium once the condition appears in a mussel, thus sterilizing the mussel as far as natural reproduction is concerned. These bacteriological studies are being continued in connection with the other pollution studies mentioned below.

Tests on the closing reactions and responses to nutrient fluids have shown that the glochidia from mussels living in polluted waters are on the whole much less reactive than glochidia from mussels held in pure water. Several specific substances have been found which can contribute to this reduction in activity of the glochidia. The resulting reduction in activity of the glochidia by these pollution substances amounts practically to the sterilization of the mussel, as the glochidia are often found unable to close, which would, of course, prevent any natural replacement of these mussels as the glochidia would not be able to attach themselves to fishes.

Condition of fresh-water mussels and of mussel beds.—Detailed physiological studies of the blood and internal organs of over 1,000 fresh-water mussels were made to ascertain the normal conditions in healthy mussels. These data are now being used to determine the effects of pollution on fresh-water mussels.

The adult fresh-water mussel has been found to be very sensitive to a variety of substances which may be present in fresh water, in fact contrary to the view commonly held, these studies have shown that many species of fresh-water mussels are fundamentally clean-water animals and that their ability to adjust themselves to conditions of stream pollution is sharply limited. Many substances placed in solution in the water surrounding the mussels were soon recovered in the blood of the mussels, and the average fresh-water mussel was found to have little ability to prevent the entry of toxic and other undesirable substances into the blood, but that it depends upon temporary closure of the shell to keep out noxious substances. Consequently these mussels are unable to withstand the conditions in many streams where contaminating substances are constantly poured into the water, as the mussels can not remain closed indefinitely.

Purification of water by mussels.—An elaborate series of experiments has been in progress since early spring dealing with the question of fresh-water mussels as water purifiers. The removal of silt, organic débris, and other materials, under various conditions by these animals is being checked.

Two special pieces of apparatus have been evolved for this work: (1) A device which maintains a constant condition of turbidity in the aquarium under observation so that mussels may be studied for long periods of time under conditions similar to those in rivers and streams just after heavy rains, when the water contains large amounts of silt and clay in suspension; and (2) an apparatus by means of which very minute quantities of suspended matter in the water may be measured, thus making quantitative studies possible.

The activities of individual mussels have been recorded continuously for long periods of time (in many cases in excess of 1,000 hours). From these observations it has been found that the efficiency of a fresh-water mussel as a water clearer has been greatly overestimated in the popular accounts of these animals. Many mussels were found to remain closed for more than 50 per cent of the time, and they can not purify water during the time they are closed. Again the mussels in an effort to protect themselves close frequently when pollution materials are added to the water so that during the time when the purification of water is most desired, the mussels are most apt to be closed.

Concerning the removal of silt it was found that such silt as is taken out of the water by the fresh-water mussels is returned to the stream in the form of small globular masses in which the slit is bound together with mucus secreted by the mussel, and that these masses subsequently disintegrate so that the silt has been removed only temporarily from the stream.

The bacterial studies carried along with these activity experiments have shown that in material taken into the alimentary canal of the mussels the bacteria may pass through the mussel unaffected, to be returned to river water in less than five hours, so that the reduction of bacteria in river water by mussels not only does not take place but in many experiments it was found that the number of bacteria in the water actually increased after the mussel was placed in the water.

SURVEY OF UPPER MISSISSIPPI RIVER

From June 29 to September 6, inclusive, the personnel of the Columbia unit was engaged in a survey of the Mississippi River from Quincy, Ill., to Point au Sable, Minn., in Lake Pepin, conducted jointly by the Corps of Engineers, U. S. Army, and the U. S. Bureau of Fisheries to consider the probable effects of the changes in the Mississippi River incident to construction of the proposed 9-foot channel. This survey gave particular attention to the changes which have been produced in the Mississippi River and its fauna and flora by the Keokuk Dam and by the various wing dams which have been constructed as aids to navigation.

U. S. Engineer quarterboat *No. 348* (Fig. 9) was placed at the disposal of the U. S. Bureau of Fisheries, and was used throughout the summer as a floating laboratory. Ample equipment was taken aboard to provide for the chemical, physical, bacteriological, and biological work in the field, and the preserved material was forwarded to the Columbia laboratory for final study.

Fresh-water mussels, fish, and fish food were collected and studied. and detailed chemical and physiological analyses of both the water and the river bottom were made throughout the summer. Individual observations on over 6,500 fresh-water mussels above were made during the course of this work and large quantities of other material taken.

In the main the results of this work may be summarized as follows:

There are three major factors at work at present changing the fisheries situation in the Mississippi and each of these combines with the other two in accelerating the change now going forward.

(*a*) Construction and reclamation of flooded land by dikes and pumping stations have reduced the lateral shore zones of shallow water in many places along the Mississippi to such an extent that suitable spawning grounds and shallow waters in which young fish may thrive are practically wanting. With the loss of these lateral zones of shallow water the production of plankton, the basic fish food, has been greatly reduced in certain parts of the river.

(*b*) Municipal and industrial wastes, sewage and factory run-offs in particular, have so polluted many sections of the river that only those animals capable of existing under very adverse conditions are able to maintain themselves. This problem is acute in many places and the bacterial counts from water at considerable distances from these sources of pollution were extremely high.

(*c*) The enormous quantities of erosion silt entering the Mississippi have produced a condition of supersaturation so that any slowing of the water either by man-made or by natural obstructions results in a rapid deposition of large quantities of silt. This silt first of all is smothering out all sorts of bottom life by simply burying the bottom animals under a layer of soft ooze, varying from a few inches to 7 or 8 feet in thickness, in which they are unable to live. Besides this factor, and it in itself is serious, this silt carries down with it quantities of undestroyed organic material put into the river by the sewage of the larger cities. This organic matter is buried in a thick colloidal suspension and the decomposition of the organic fraction proceeds more slowly than if the waste were in the moving stream. As a result the oxygen demand of water rises rapidly and the oxygen saturation falls in those portions of the river where the water is slowed down and the silt deposited. Large volumes of methane, and various sulphurous gases were found rising from some of these silt deposits, and the fauna reduced to bloodworms and other forms indicative of low oxygen conditions.

FIGURE 9.—U. S. Engineers' Quarterboat *No. 348*, used as a floating laboratory in a limnological study of the upper Mississippi River

The silt situation was found very acute, as practically all the river bottom is receiving a deposit of this silt-sewage mixture except the swifter portions of the channel proper. Control of the silt and sewage situations is badly needed regardless of the construction of dams or levees, as these merely make more immediately acute conditions which will doom the desirable fauna of the river unless checked soon. Large areas of dead mussels which had been killed by the silt-sewage layer were found at many stations and the changes in fish fauna from the bass-crappie group to the carp-sucker group were very evident in the localities where these conditions of pollution were very severe.

The replacement of the valuable fresh-water mussels, such as the yellow sand shell, the pigtoe, the niggerhead, and the mucket, by noncommercial species was very evident in all sections of the river studied. Paper shells and floaters, worthless species as far as button manufacturers are concerned, were the only species found to be replacing themselves under the new conditions. Young of the commercial species were rarely found, while large numbers of the young floaters and paper shells were collected in many places, particularly behind wing dams, log-jams, and other obstructions where the sand shells and other valuable species had been killed out by the silt deposits.

POLLUTION STUDIES

In connection with the Mississippi River survey, the glochidia studies, and certain industrial problems, the effects of stream pollution on fish, fish food, and fresh-water mussels have been investigated both in the field and in the laboratory. Throughout the summer and fall the bacteriologist of the unit has followed the bacterial flora in all of these studies, and the chemical, physiological, and bacteriological aspects have been investigated by other members of the staff. Work has been carried on and is in progress along the following lines:

(*a*) General and municipal sewage pollution; (*b*) industrial pollution, particularly sulphur, acid pollution, and arsenic; (*c*) erosion silt; and (*d*) oxygen saturation.

In the experimental studies on pollution the oxygen limits as influenced by these various pollution factors have been given particular attention. Fresh-water mussels, for example, show a marked reduction in their vital activities when the oxygen saturation is reduced to below 25 per cent, and their reactions to the specific substances polluting the water are modified by the state of activity as produced by the oxygen saturation, thus creating a physiological vicious cycle.

BOTTOM STUDIES

Experimental studies both in the laboratory and on selected areas in the river concerning the physiological, chemical, and biological factors contributing to the survival or elimination of juvenile mussels have been made with a view to obtaining data on suitable grounds for the planting of young mussels. Much progress has been made in this field where there are few previous observations.

HOLDING AND FEEDING OF ADULT FRESH-WATER MUSSELS

In view of the rapid decline in the valuable commercial mussels in so many parts of the Mississippi drainage and the attendant difficulties in securing adequate breeding stock and good glochidia for the propagation work, series of adult mussels have been held throughout the year in tank aquaria to determine whether it is feasible to hold adult mussels in numbers and thus select proper breeding stock. As a corollary of this work the conditions of the animals as shown by blood and other biochemical studies have been followed. One of these biochemical studies has demonstrated that mussels in good condition when first taken from the river have a large reserve of stored food in the form of glycogen, and that if kept in water containing practically no mussel food this reserve of glycogen is steadily used up.

The stored glycogen seems adequate, however, in the case of healthy mussels to carry them through several months of starvation. When fed, the glycogen content of the mussels rises rapidly to the former level. It does seem feasible from these experiments to hold mussels in water containing little mussel food and to select breeding stock from the best animals surviving. Application of these findings are to be tested on a large scale through the coming season.

APPROPRIATIONS

It often has been said that the financial support provided by Congress for the scientific work of the bureau may be taken as a measure of public approval of the results of the research program. If such be the case, we may view with considerable satisfaction the record of appropriation during the past few years. Up to the period of recovery from the World War, Federal appropriations for scientific research by the bureau increased at a fairly constant rate, along with the general development of the country and the expanding functions of government. From 1918 to 1924 followed a period of retrenchment in appropriations, but from that year until the present, scientific inquiry's funds have shown a steady increase. Funds expended by the division of scientific inquiry for fishery research in the United States, given in round numbers, for the various years are as follows: For 1924, $91,000; 1925, $118,000; 1926, $129,000; 1927, $144,000: 1928, $175,000; 1929, $198,000; 1930, $198,000; and 1931, $262,000. These figures represent the combined appropriations from various accounts, except funds spent for vessel operations in connection with scientific work. In addition to the totals shown, in the fiscal year 1929, $20,000, and in 1931, $179,000, were appropriated for building improvements at the biological laboratories or for the erection of new ones.

For the fiscal year 1931 these funds were allotted in the various sections of the country as follows: For fishery investigations in the Atlantic and Gulf coast areas, 30 per cent; for the Great Lakes and interior lakes, 9 per cent; for the Pacific coast, 16 per cent; for investigations in the interest of fish culture throughout the country, 17 per cent; for shellfish investigations, including oyster-cultural studies, mussel propagation and pollution studies, and shrimp investigations, 19 per cent; for studies on the conservation of fish by means of screens and ladders, 9 per cent. With authorization for continued increases in appropriations for scientific work provided by the act of May 21, 1930, it is anticipated that the orderly program of investigation designed to make more effective the conservation of our marine and inland fisheries will be carried out, and that attention can be given to other sections of the country and to fisheries that are at present neglected. The only weakness of this program of expansion lies in the failure to provide for increased vessels' operations as was mentioned above. On the Atlantic coast particularly fishery investigations are hampered by lack of adequate vessel facilities, and it is hoped that the early rectifying of this lack will permit the complete realization of a well-rounded program of fishery investigation.

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PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR, 1931[1]

By GLEN C. LEACH, *Chief, Division of Fish Culture*

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INTRODUCTION

The division of fish culture of the Bureau of Fisheries distributed a total of 7,121,805,700 fish and fish eggs during the fiscal year 1931. While this does not establish a new record, it is exceeded only by the output of 7,570,482,300 fish and eggs during the fiscal year 1930, and it signifies the successful employment of the division's facilities during a year in which drouth and adverse weather conditions affected production.

There is no gage by which the results of fish-cultural activities may be accurately measured. The advantages accruing to a race of fish through fish-culture permit a large percentage of them to reach a stage of development which a significantly smaller number would reach otherwise. Fish-cultural methods constitute one of the chief agencies that can be employed to counterbalance the drain that intense commercial and game fishing place on the country's fishery resources. As was stated in last year's annual report, the passage by Congress on May 21, 1930, of a 5-year program, listing more than 30 items providing for the expansion of existing fish-cultural activities or the establishment of new ones, is an indication of the conviction of that body relative to the value of Federal fish-cultural work. As the convictions of Congress are in general an indication of the beliefs and sentiments of the United States as a whole, it is apparent that Federal fish-cultural work is regarded widely as a most important contributing factor in the perpetuation of fishery resources. This sentiment is further attested by the interest displayed by numerous organizations and individuals in the selection of hatchery sites during the first year's operation of the 5-year program and by the constantly increasing flood of applications submitted for game fish.

Part 1.—FISH PRODUCTION: PROPAGATION AND RESCUE WORK

SPECIES HANDLED

The bureau's fish-cultural activities extend throughout the country. Operations are centered upon the propagation of important game and commercial fishes that are amenable to efficient fish-cultural methods. A listing of the species propagated during the past year follows:

CATFISHES (SILURIDÆ):
  Catfishes (Leptops sp.).
  Spotted catfish (*Ictalurus punctatus*).
  Horned pout (*Ameiurus nebulosus*).
SUCKERS (CATOSTOMIDÆ): Buffalofish (Ictiobus sp.) and suckers (*Catostomus commersonii*).
CARP (CYPRINIDÆ):
  Common carp (*Cyprinus carpio*).
  Goldfish (*Carassius auratus*).
SHAD AND HERRING (CLUPEIDÆ):
  Shad (*Alosa sapidissima*).
  Glut herring (*Pomolobus aestivalis*).
SALMONS, TROUTS, AND WHITEFISHES (SALMONIDÆ):
  Common whitefish (Coregonus sp.).
  Cisco (*Argyrosomus artedi*).
  Chinook, king, or quinnat salmon (*Oncorhynchus tschawytscha*).
  Chum salmon (*Oncorhynchus keta*).
  Humpback salmon, pink salmon (*Oncorhynchus gorbuscha*).
  Silver salmon, coho salmon (*Oncorhynchus kisutch*).
  Sockeye, blueback, or red salmon (*Oncorhynchus nerka*).
  Steelhead salmon (*Salmo gairdneri*).
  Atlantic salmon (*Salmo salar*).
  Landlocked salmon (*Salmo sebago*).
  Rainbow trout (*Salmo shasta*).
  Golden trout (*Salmo roosevelti*).
  Black-spotted trout, redthroat trout (*Salmo lewisi*).
  Loch Leven trout (*Salmo levenensis*).
  Lake trout, Mackinaw trout (*Cristivomer namaycush*).
  Brook trout (*Salvelinus fontinalis*).
GRAYLINGS (THYMALLIDÆ): Montana grayling (*Thymallus montanus*).
PIKES (ESOCIDÆ): Common pickerel (*Esox lucius*).
SUNFISHES (CENTRARCHIDÆ):
  Crappie (*Pomoxis annularis* and *P. sparoides*).
  Largemouth black bass (*Micropterus salmoides*).
  Smallmouth black bass (*Micropterus dolomieu*).
  Rock bass (*Ambloplites rupestris*).
  Warmouth bass, goggle-eye (*Chaenobryttus gulosus*).
  Bluegill sunfish (*Lepomis incisor*).
  Green sunfish (*Apomotis cyanellus*).
  Redbreasted bream (*Lepomis auritus*).
  Red-eared sunfish (*Eupomotis heros*).
  Common sunfish (*Eupomotis gibbosus*).
  Rio Grande perch (*Herichthys cyanoguttatus*).
PERCHES (PERCIDÆ):
  Pike perch (*Stizostedion vitreum*).
  Yellow perch, ringed perch (*Perca flavescens*).
SEA BASSES (SERRANIDÆ):
  White bass (*Roccus chrysops*).
  Striped bass)*Roccus lineatus*).
DRUMS (SCIANIDÆ): Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).
CODS (GADIDÆ):
  Cod (*Gadus callarias*).
  Haddock (*Melanogrammus aeglefinus*).
  Pollock (*Pollachius virens*).
FLOUNDERS (PLEURONECTIDÆ): Winter flounder, American flatfish (*Pseudopleuronectes americanus*).
MACKEREL (SCOMBRIDÆ): Common mackerel (*Scomber scombrus*).

OUTPUT

The magnitude of fish-cultural operations depends largely upon the availability of brood stock. Other factors are temperature and water conditions, the amount of equipment used, the size of the operating force, and the progress of science in the development of methods and apparatus. Where a brood stock is held at a hatchery, as with trout and bass, a fairly consistent production may be realized from year to year. Where collections of eggs are made from traps and racks intercepting spawning migrants, as with the salmon, the production may be fairly uniform, though it depends largely on the escapement from commercial fisheries. The collection of eggs from purely lake forms, such as whitefish, lake trout, and cisco, and from such salt water fishes as the cod, haddock, pollock, flounder, and mackerel, depends upon the abundance of fish and upon weather conditions in the vicinity of the spawning areas, as these conditions regulate largely the use of fishing gear. Because by far the greater proportion of the numerical output of the division consists of eggs and fish of the third group, the total production is largely influenced by conditions beyond the bureau's control.

Adverse weather conditions do not often cause the suspension of all activities in the collection of eggs of a species of fish. In 1931, however, they were largely responsible for a decrease of 1,135,999,000 in the distribution of cod and pollock as compared with the output of these two species during the preceding year. This decrease was more than twice the difference between the total distribution in 1931 and the all-time record of 1930.

The total distribution of the past year shows a 6 per cent decrease when compared with the total for 1930. The output of the game fishes, included in the total, decreased 3½ per cent, due largely to a considerable decline in the number of sunfish handled in the rescue work; and the output of the marine species decreased 10 per cent, owing to adverse weather conditions encountered during the collection of cod and pollock eggs. On the other hand, the distribution of anadromous fishes increased 98 per cent, owing to increased collections of eggs of the shad, glut herring, and Pacific salmon; and the output of commercial fishes of interior waters was increased 16 per cent, due to the unusually large numbers of carp and buffalofish handled and to larger numbers of eggs of the cisco, pike perch, and whitefish obtained in the Great Lakes operations.

Of the total distributions, 3.6 per cent were anadromous species and 2.8 per cent game fishes. The marine species, which are planted in the egg and fry stages, constituted 81.8 per cent; 11.4 per cent consisted of the commercial species of interior waters, while the miscellaneous fishes, mostly species of minor importance handled in the rescue operations, amounted to two-fifths of 1 per cent. The fingerlings distributed, numbering 320,040,700, showed a 28 per cent increase over the corresponding figures for 1930.

Summary, by species, of the output of fish and fish eggs during the fiscal year ended June 30, 1931

Species	Eggs	Fry	Fingerlings	Total
Catfish			84, 521, 000	84, 521, 000
Buffalofish	92, 340, 000	11, 044, 000	12, 104, 000	115, 488, 000
Common sucker	7, 375, 000			7, 375, 000
Carp	112, 995, 000		25, 028, 000	138, 023, 000
Shad		19, 490, 000		19, 490, 000
Glut herring		50, 000, 000		50, 000, 000
Whitefish	10, 960, 000	146, 455, 000		157, 415, 000
Cisco		63, 400, 000		63, 400, 000
Chinook salmon	15, 694, 000	3, 833, 000	57, 308, 000	76, 835, 000
Chum salmon		17, 475, 000	411, 000	17, 886, 000
Silver salmon	226, 000	6, 909, 000	1, 636, 000	8, 771, 000
Sockeye salmon	3, 576, 000	14, 623, 000	32, 860, 000	51, 059, 000
Humpback salmon	16, 263, 000	1, 312, 900	1, 145, 000	18, 720, 000
Steelhead salmon	926, 000	42, 000	1, 508, 800	2, 476, 800
Atlantic salmon	3, 025, 000		943, 600	3, 968, 600
Landlocked salmon	30, 000	38, 000	640, 500	708, 500
Rainbow trout	5, 150, 000		8, 238, 800	13, 388, 800
Golden trout			25, 500	25, 500
Black-spotted trout	6, 268, 000	46, 000	9, 780, 600	16, 094, 600
Loch Leven trout	8, 995, 000	2, 748, 000	4, 959, 400	16, 702, 400
Lake trout	840, 000	24, 445, 000	443, 900	25, 728, 900
Brook trout	1, 396, 000	1, 791, 000	13, 109, 200	16, 296, 200
Grayling	1, 000, 000		3, 000	1, 003, 000
Pike and pickerel		3, 113, 000	813, 600	3, 926, 600
Mackerel	1, 611, 000	8, 850, 000		10, 461, 000
Crappie			28, 548, 800	28, 548, 800
Largemouth black bass		1, 036, 000	2, 406, 000	3, 442, 000
Smallmouth black bass		729, 000	103, 700	832, 700
Rock bass			57, 300	57, 300
Warmouth bass			37, 900	37, 900
Sunfish			12, 652, 900	12, 652, 900
Pike perch	30, 990, 000	164, 363, 000		195, 353, 000
Yellow perch		113, 250, 000	2, 048, 200	115, 298, 200
Striped bass		9, 500, 000		9, 500, 000
White bass			52, 800	52, 800
Rio Grande perch			48, 400	48, 400
Fresh-water drum			14, 500	14, 500
Cod	1, 331, 632, 000	193, 666, 000		1, 525, 298, 000
Haddock	412, 477, 000	34, 951, 000		447, 428, 000
Pollock		240, 219, 000		240, 219, 000
Winter flounder	263, 652, 000	3, 341, 016, 000		3, 604, 668, 000
Miscellaneous fishes			18, 590, 300	18, 590, 300
Total	2, 327, 421, 000	4, 474, 344, 000	320, 040, 700	7, 121, 805, 700

NOTE.—5,305 terrapins produced at Beaufort (N.C.) scientific station were turned over to the State of North Carolina for planting.

COOPERATION WITH OTHER CONSERVATION AGENCIES

Propagation of fish life in this country is not confined to the activities of the Bureau of Fisheries. Elsewhere in this publication the activities of the States in this work are shown, while various other agencies, including many sportsmen's organizations and individuals, are also engaged in such work. The fact that these agencies are working toward the same ends, and in many cases in the same fields, makes apparent the need of cooperation, in order to obviate duplication of effort and expenditure and to avoid wasteful overlapping of distributions. Beneficial results have followed the readiness of the bureau and the States to render mutual assistance in times of stress, such as the overcrowding of hatchery facilities, abnormal losses encountered through floods, disease conditions, or a lack of fish to meet the demands. The joint use of apparatus, both for the handling of eggs and fish and for distribution work, and the loaning of apparatus and fish-cultural assistance have resulted in increased efficiency and the more successful prosecution of the work. The following are cited as some of the outstanding cases in which cooperation between the

States and the Bureau of Fisheries has occurred, though it is not assumed to present a full picture of the existing cooperative relations.

The bureau's collections of whitefish and lake trout eggs for stocking its hatcheries in Michigan were made in cooperation with the fisheries authorities of that State. In New York cisco eggs for stocking the Cape Vincent hatchery were obtained as a result of joint operations between the bureau and the State. The collection of black-spotted trout eggs in Pyramid Lake, Nev., was conducted conjointly by the bureau and the State authorities, under the protection afforded by the Federal Indian Service. Large numbers of Atlantic salmon eggs received by the bureau from the Canadian Government in exchange for eggs of other species were turned over to the Maine authorities for the restocking of waters in that State.

Assistance extended by the North Carolina Department of Conservation largely made possible the bureau's work of propagating striped bass at Weldon, N. C. In addition to supplying funds for the operation of the Weldon hatchery, the State loaned trucks and the services of its personnel to assist in distributing the fry. The superintendent of the bureau's Mammoth Spring (Ark.) station continued to assist in the operation of the State hatchery at Lonoke, Ark. The South Carolina authorities assisted financially in the bureau's shad work in that State, thus permitting the conduct of work on a much more extensive scale than otherwise would have been possible. Pond fish propagation at the Miles City substation of the bureau in Montana was conducted conjointly with the Montana Fish and Game Department. The State also rendered material assistance in distributing the output of this station and in other work. As in the past, a close coordination of operating units was maintained between the bureau and the fisheries departments of Oregon and Washington in the conduct of Pacific salmon propagation. In connection with that work many transfers of eggs are necessary to assist in restoring failing

FIGURE 1.—Removing fish from rearing pond in the Upper Mississippi Wild Life Refuge

runs of salmon in various fields. Part of the assistance rendered to various States by the bureau is made evident in the appended table of fish egg assignments to State and Territorial fish commissions.

The national forests and national parks, covering large areas in the United States, abound in streams and lakes noted for their fishing. As the Forest Service and the Park Service do not propagate fish for these areas, the Bureau of Fisheries has undertaken to rear fish for stocking them. Work of this character in Yellowstone Park is of such magnitude that a large permanent hatchery and pond system is in annual operation in that region. The same may be said of the Glacier National Park, where a substation is maintained. During the past year these two hatcheries produced nearly 6,000,000 fingerling rainbow, black-spotted, and Loch Leven trout for distribution within park boundaries. Most of the distributions were handled by employees of the National Park Service, that organization having conducted biological surveys previously for the purpose of ascertaining stocking requirements and formulating a planting policy. Other national parks and national forests throughout the country receive the benefit of the bureau's distributions. A hatchery site in Rainier National Park in the State of Washington was selected in the course of the year and a hatchery to supply trout for the waters in that reservation will be erected soon. An extensive survey in the Wasatch National Forest in Utah was made by the bureau with the view of formulating a stocking policy. Plans for work of a similar character in other national forest areas were also made.

The bureau's egg-collecting work at Pyramid Lake, Nev., which is dependent upon the tactful assistance of the Indian Service, has been mentioned in connection with cooperation in Nevada. Incidental to the bureau's general distribution work, many streams and lakes in Indian reservations throughout the United States have been stocked with fish.

COOPERATIVE FISH NURSERIES

A significant factor in emphasizing the interest manifested in the conservation and restoration of the country's game fish resources is the large number of active sportsmen's organizations. The members of these associations enthusiastically indorse the work of propagating and distributing game fishes; and many of the organizations, with the bureau's advice and assistance, have established nurseries to aid in the effective stocking of inland waters. Usually these nurseries consist of a pond or series of ponds in which fry furnished by the bureau are held and fed until they reach a large fingerling or yearling size, when they are liberated. Although the bureau retains the right to claim 50 per cent of the output of each cooperating nursery, it has seldom been necessary to exercise that right.

In addition to the cooperative nurseries maintained by sportsmen's groups, there are many organizations which operate either independently or rely upon the bureau's assistance merely in an advisory capacity. In some cases cooperative nurseries are maintained and managed by individuals, and in one instance the cooperating party is a county government. The operations of these units result in greatly increased effectiveness in the stocking of public waters. Large fingerling or yearling fish are much better equipped than are fry to survive the conditions encountered in open streams and lakes, and with the increased numbers of large-sized fish available for the purpose a far more thorough and liberal distribution of fish is assured. Another valuable feature connected with the working out of the cooperative nursery scheme is its influence in awakening and fostering public interest in conservation measures.

At the end of the previous fiscal year grave fears were expressed as to the outcome of rearing operations at the cooperative nurseries during the year about to begin. The reason for this apprehension was the protracted drought, which at that time was reducing the flow of springs, cutting down the supply of water in streams and lessening the volume of lakes in many sections of the country. Many of the nurseries were affected. Some suspended activities while others reduced the scope of operations. Heavy losses were suffered that would not have occurred under normal water conditions. A number of organizations also found it difficult to continue operations during a year of national financial stress. As a result of these conditions the number of active nurseries declined from 125 in 1930 to 119 during the fiscal year 1931. To these nurseries a total of 4,109,622 fish were allotted, the species furnished including brook trout, rainbow

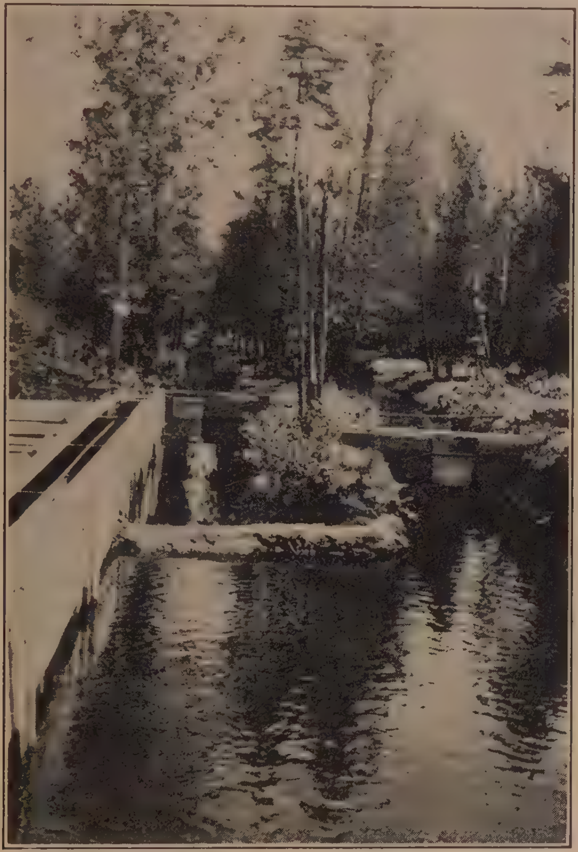

FIGURE 2.—Trout ponds of a cooperative nursery operated by Clare County, Mich., and the Bureau of Fisheries.

trout, Loch Leven trout, landlocked salmon, Atlantic salmon, and black bass. A list of the nurseries conducting rearing operations during 1931 is included in this report.

Cooperative nurseries and rearing ponds supervised by the bureau in 1931

Locality	Number of fish supplied	Kind
Maryland:		
Catoctin	63, 000	Brook trout.
Williamsport	7, 500	Black bass.
Massachusetts:		
Adams	10, 000	Brook trout.
Housatonic	3, 000	Do.
Knightsville	6, 000	Do.
Lowell	20, 000	Do.
Ludlow	3, 300	Do.
Pittsfield	20, 000	Do.
Richmond Furnace	2, 000	Do.
Springfield	6, 000	Do.
Michigan:		
Alpena	15, 000	Do.
Do	2, 500	Rainbow trout.
Highland	550	Do.
Hillman	400, 300	Brook trout.
Do	8, 500	Landlocked salmon.
Do	200, 000	Brook trout.
Do	15, 000	Rainbow trout.
Rose City	100, 200	Brook trout.
Minnesota:		
Anoka	5, 000	Do.
Lake City	3, 000	Do.
Mora	5, 000	Do.
Northfield	5, 250	Rainbow trout.
Red Wing	16, 000	Brook trout.
Rochester	6, 000	Do.
Rushford	25, 000	Rainbow trout.
St. Charles	2, 000	Brook trout.
Winona	20, 000	Loch Leven trout.
Do	28, 000	Brook trout.
Do	20, 000	Rainbow trout.
New Hampshire:		
Claremont	20, 000	Brook trout.
Georges Mills	10, 000	Do.
Greenland	5, 000	Do.
Do	5, 000	Atlantic salmon.
Hookset	10, 000	Brook trout.
Lebanon	16, 000	Do.
Merrimack	10, 000	Do.
North Conway	30, 000	Do.
Peterboro	10, 000	Do.
Wilton	10, 000	Do.
New York:		
Adams	12, 371	Do.
Arena	19, 500	Loch Leven trout.
Austerlitz	3, 000	Brook trout.
Barneveld	662, 803	Do.
Do	96, 140	Rainbow trout.
Do	55, 608	Loch Leven trout.
Do	30, 000	Lake trout.
Malone	69, 500	Brook trout.
Do	4, 500	Loch Leven trout.
Oneonta	76, 000	Brook trout.
Do	7, 000	Loch Leven trout.
Watertown	183, 450	Brook trout.
Pennsylvania:		
Altoona	10, 000	Loch Leven trout.
Do	15, 000	Rainbow trout.
Do	14, 700	Brook trout.
Analomink	10, 000	Loch Leven trout.
Bellefonte	35, 000	Brook trout.
Berwick	20, 000	Do.
Do	15, 000	Loch Leven trout.
Do	12, 200	Rainbow trout.
Bloomsburg	20, 000	Brook trout.
Do	10, 000	Loch Leven trout.
Carrolltown	10, 000	Do.
Chester	10, 000	Rainbow trout.
Pennsylvania—Con.		
Chester	10, 000	Loch Leven trout.
Clearfield	6, 300	Brook trout.
Connellsville	10, 000	Do.
Galeton	40, 000	Do.
Hazleton	15, 000	Do.
Do	15, 000	Rainbow trout.
Indiana	9, 800	Brook trout.
Johnsonburg	10, 000	Do.
Johnstown	9, 800	Do.
Do	10, 200	Rainbow trout.
Kane	15, 000	Brook trout.
Ligonier	14, 700	Do.
Do	10, 200	Rainbow trout.
Do	15, 000	Loch Leven trout.
Muncy	10, 000	Brook trout.
Do	25, 000	Loch Leven trout.
Do	30, 000	Brook trout.
Meyersdale	30, 000	Do.
Punxsutawney	10, 500	Do.
Renovo	40, 000	Do.
Scranton	60, 000	Loch Leven trout.
Shickshinny	20, 000	Brook trout.
Somerset	25, 000	Do.
Do	10, 200	Rainbow trout.
Trout Run	50, 000	Brook trout.
Troy	10, 000	Do.
Do	5, 000	Loch Leven trout.
West Pittston	10, 000	Brook trout.
Do	5, 000	Loch Leven trout.
Williamsport	20, 000	Brook trout.
Do	15, 000	Do.
Do	30, 000	Loch Leven trout.
Vermont:		
Averill	93, 000	Brook trout.
Do	86, 000	Lake trout.
Do	38, 000	Landlocked salmon.
Bennington	1, 500	Brook trout.
Virginia:		
Dumfries	20, 000	Black bass.
Shawsville	12, 000	Brook trout.
Trout Dale	9, 000	Do.
Warm Springs	30, 000	Do.
Do	20, 000	Rainbow trout.
West Virginia:		
Durbin	25, 000	Brook trout.
Do	5, 000	Rainbow trout.
Wisconsin:		
Arcadia	15, 000	Brook trout.
Bay City	5, 000	Do.
Boscobel	19, 500	Do.
Do	5, 250	Rainbow trout
Boyd	8, 000	Brook trout.
Darlington	5, 950	Rainbow trout.
Eau Claire	13, 000	Brook trout.
Do	10, 000	Rainbow trout.
Do	30, 000	Do.
Ellsworth	30, 000	Do.
Do	10, 000	Brook trout.
Elmwood	5, 000	Do.
El Paso	10, 000	Do.
Elroy	5, 850	Do.
Do	14, 950	Do.
Galesville	20, 000	Do.
Hatley	20, 000	Do.
Hazel Green	12, 000	Do.
Holmen	8, 000	Do.
Independence	20, 000	Do.
La Crosse	5, 000	Do.
Do	12, 600	Do.
Do	20, 000	Loch Leven trout.

Cooperative nurseries and rearing ponds supervised by the bureau in 1931—Contd.

Locality	Number of fish supplied	Kind	Locality	Number of fish supplied	Kind
Wisconsin—Con.			Wisconsin—Con.		
Laona	30, 000	Brook trout.	Rothschild	13, 000	Brook trout.
Madison	5, 000	Loch Leven trout.	Shullsburg	10, 000	Loch Leven trout.
Do	5, 200	Brook trout.	Stanley	20, 000	Brook trout.
Manitowoc	11, 400	Rainbow trout.	Stevens Point	19, 850	Rainbow trout.
Marathon	20, 000	Brook trout.	Do	10, 000	Brook trout
Medford	5, 000	Do.	Tunnel City	10, 000	Do.
Monroe	15, 000	Do.	Viola	3, 000	Do.
Mountain	20, 000	Do.	Do	5, 000	Do.
Nekoosa	20, 000	Do.	Viroqua	21, 000	Loch Leven trout.
Osseo	10, 000	Do.	Westby	12, 000	Do.
Park Falls	15, 000	Do.	Whitehall	2, 000	Brook trout.
Plum City	7, 000	Rainbow trout.			
Do	3, 000	Brook trout.		4, 109, 622	
Prescott	30, 000	Do.			

STATE FISH-CULTURAL ACTIVITIES

In response to the widespread interest manifested in State fish-cultural work through the bureau's correspondence with the general public, steps have been taken in recent years to secure, by the questionaire method, information pertaining to such activities. The magnitude of the work indicated by the figures thus obtained emphasizes the attention that is being given to the restoration of depleted fishing areas and the creation of new centers of supply. The extent of the fish-cultural work prosecuted by the States, the Federal Government, and other agencies makes it apparent that the vital problems connected with the depletion of the game and commercial fisheries are recognized and that there exists a considerable and constantly increasing public interest in the conservation of the country's fishing resources.

Data on State fish-cultural activities and licenses

State	Number of fishing licenses issued	Fees received from licenses	Number of hatcheries	Number of fish-cultural employees	Expenditures for propagation of fish
Alabama	503	$2, 515. 00	1	2	$8, 643. 75
Arizona	38, 955	115, 755. 00	3	4	10, 529. 00
Arkansas	20, 000	45, 000. 00	1	4	8, 000. 00
California	248, 319	508, 875. 00	28	114	275, 940. 00
Colorado	114, 576	210, 387. 00	15	25	83, 611. 79
Connecticut	36, 019	115, 889, 30	4	10	83, 800. 00
Delaware	3, 667	8, 828. 15			465. 50
Florida	27, 312	95, 988. 80	3	13	32, 538. 58
Georgia			1	2	
Idaho	91, 795	194, 685. 40	11	16	174, 922. 81
Illinois	424, 312	179, 000. 00	5	5	50, 000. 00
Indiana	328, 397	306, 545. 20	5	18	57, 552. 88
Iowa	270, 000	270, 000. 00	4	8	108, 517. 84
Kansas	98, 622	99, 864. 00	4	9	48, 303. 00
Kentucky	66, 260	56, 321. 00	3	4	11, 718. 25
Louisiana	38, 070	43, 250. 00	1	10	8, 759. 81
Maine	109, 971	132, 468. 00	13	13	181, 519. 24
Maryland	13, 969	25, 714. 91	14	12	18, 053. 15
Massachusetts	122, 446	287, 749. 50	7	11	56, 458. 18
Michigan	142, 536	250, 328. 00	15	65	350, 000. 00
Minnesota	420, 811	360, 246. 11	13	33	108, 812. 45
Missouri	290, 657	349, 702. 00	7	12	16, 094. 00
Montana	87, 575	188, 684. 00	14	38	113, 954. 55
Nebraska	175, 000	175, 000. 00	4	19	100, 000. 00
Nevada	7, 595	11, 911. 00	1	3	20, 000. 00
New Hampshire	74, 252	189, 511. 35	8	30	120, 000. 00

Data on State fish-cultural activities and licenses—Continued

State	Number of fishing licenses issued	Fees received from licenses	Number of hatcheries	Number of fish-cultural employees	Expenditures for propagation of fish
New Jersey	200, 068	291, 766. 50	2	20	90, 620. 97
New Mexico	22, 000	45, 000. 00	6	14	56, 000. 00
New York	653, 383	706, 851. 93	25	256	332, 804. 94
North Carolina	21, 400	37, 680. 88	5	12	36, 655. 88
North Dakota	17, 155	7, 294. 90	3	6	12, 000. 00
Ohio	98, 355	100, 551. 14	15	67	104, 744. 19
Oklahoma	165, 673	165, 673. 00	5	13	29, 800. 00
Oregon	79, 888	270, 848. 00	42	145	261, 885. 45
Pennsylvania	272, 014	419, 158. 00	8	32	185, 201. 73
Rhode Island	12, 219	14, 410. 85	1	4	23, 000. 00
South Carolina	138	1, 380. 00			
South Dakota	112, 391	118, 624. 00	6	9	39, 104. 73
Tennessee			1		
Texas	32, 699	32, 699. 00	7	21	40, 000. 00
Utah	65, 167	140, 000. 00	8	15	67, 464. 20
Vermont	62, 249	85, 170. 25	4	12	10, 767. 49
Washington	217, 995	409, 529. 00	27	69	104, 172. 62
West Virginia	160, 000	186, 000. 00	3	3	11, 000. 00
Wisconsin	76, 000	205, 000. 00	23	35	118, 700. 00
Wyoming	58, 500	75, 383. 00	8	16	63, 819. 77
Total	5, 578, 913	7, 537, 239. 17	384	1, 229	3, 635, 936. 75

Output of fish by State hatcheries

State	Trout	Bass	Other game fish	Commercial species	Total
Alabama		95, 100	106, 300		201, 400
Arizona	1, 129, 482				1, 129, 482
Arkansas		610, 000	424, 775	10, 040, 000	11, 074, 775
California	34, 711, 000	7, 649	118, 605	4, 954, 035	39, 791, 289
Colorado	26, 183, 146	59, 500			26, 242, 646
Connecticut	495, 828	10, 346	60, 936, 601	122, 842, 341	184, 285, 116
Delaware		5, 512	12, 100		17, 612
Florida		3, 247, 923			3, 247, 923
Georgia	550, 000	10, 000	50, 000		610, 000
Idaho	12, 758, 807			15, 800, 000	28, 558, 807
Indiana		832, 129	5, 111, 020	16, 270, 000	22, 213, 149
Iowa	328, 375	225, 330	59, 282, 950	10, 188, 185	70, 024, 840
Kansas		180, 700	467, 400		648, 100
Kentucky		97, 687			97, 687
Louisiana		210, 000	500, 000		710, 000
Maine	1, 840, 100			1, 109, 750	2, 949, 850
Maryland	18, 057	30, 000	350, 000	829, 726, 400	830, 124, 457
Massachusetts	588, 093	248, 589	841, 635	289, 816	1, 968, 133
Michigan	11, 704, 795	634, 190	114, 625, 776	202, 155, 000	329, 119, 761
Minnesota	9, 026, 473	120, 709	2, 806, 279	428, 227, 532	440, 180, 993
Missouri	276, 168	292, 562	529, 282		1, 098, 012
Montana	29, 009, 893	120, 512	4, 986, 165		34, 116, 570
Nebraska	427, 000	647, 000	1, 127, 000		2, 201, 000
Nevada	749, 040	8, 000	9, 608		766, 648
New Hampshire	5, 340, 272	8, 000	1, 630, 100	154, 250, 000	161, 228, 372
New Jersey	557, 790	102, 239	112, 667, 050	763, 000	114, 090, 079
New Mexico	2, 117, 000	21, 000			2, 138, 000
New York	9, 116, 909	489, 335	6, 796, 262	577, 726, 822	594, 129, 328
North Carolina	3, 898, 495	320, 818	61, 000	10, 000, 000	14, 280, 313
North Dakota		6, 725	10, 084, 280		10, 091, 005
Ohio		197, 355	1, 836, 069	85, 473, 750	87, 507, 174
Oklahoma		1, 195, 400	517, 000		1, 712, 400
Oregon	19, 773, 336		1, 897, 465	62, 415, 090	84, 085, 891
Pennsylvania	817, 002	336, 427	2, 359, 040	388, 119, 524	391, 631, 993
Rhode Island	57, 629	20, 000	166, 000		243, 629
South Dakota	1, 039, 960	25, 075	6, 980, 495	164, 040	8, 209, 570
Texas		719, 027	1, 198, 468		1, 917, 495
Utah	6, 000, 000				6, 000, 000
Vermont	652, 189	19, 550	13, 725	71, 752, 500	72, 437, 964
Washington	21, 428, 563	113, 000		131, 341, 307	152, 882, 870
West Virginia	299, 400	57, 000			356, 400
Wisconsin	6, 337, 670	710, 668	15, 816, 477	315, 688, 050	338, 552, 865
Wyoming	13, 001, 000				13, 001, 000
Total	220, 233, 472	12, 035, 057	414, 308, 927	3, 439, 297, 142	4, 085, 874, 598

In studying the tables certain modifying factors must be taken into consideration. In the first place, each State report covers the operations for its latest complete fiscal year, but as there has been no uniform selection of such a period the tables do not supply data for any complete year. However, as the general scope of State fish-cultural activities does not vary materially from year to year, the figures cited may be considered an approximate index of activities in 1930 and may serve as a standard of comparison in determining the amount of work accomplished in earlier or later years. Secondly, with regard to fishing licenses, State policies are such that in many cases licenses for fishing combined with hunting licenses are issued. Because of this practice it will be seen that the number of licensed fishermen must be smaller than is indicated by the tables. In analyzing the license figures, however, it must be borne in mind that thousands of unlicensed fishermen catch game fish. In addition to unlicensed fresh-water fishermen, most of the States do not require licenses for noncommercial salt-water fishing, a sport which claims the interest of innumerable fishermen. The figures embodied in the report do not include numbers and values of commercial fishing licenses.

The third item for consideration concerns the value of distribution figures. It is not possible to compare fairly the output of one State, as shown in these tables, with that of another because there exists a wide variation in the production policies pursued. A large number of trout fry may be raised and liberated at a cost and effort much less than would be required in rearing a like number of fingerlings. In many States, especially in the East, production is limited by the rearing of fish to legal size for stocking. States doing such work may be foremost in the value of propagation work and still not compare favorably with others when the numerical output is considered. The value of the distribution figures is made apparent, however, in a comparison of the total output or of that of the individual States from year to year. Lastly, the relative completeness of the information must be considered. Figures published in this report are from all States covered last year with the exception of Virginia.

Bearing the above consideration in mind, a comparison of the States' activities as described in this report and those for the previous year may be made. For the sake of accuracy, statistics submitted last year for Virginia are eliminated in making the following comparison. The total output is smaller than that of the previous year due to decreases in the output of trout, other game fish, and commercial species. The output of black bass increased almost 30 per cent. The total expenditure for fish propagation exceeded that of the previous year by about 1 per cent. While the importance of wild-life propagation has undoubtedly been increased, and interest in it has not diminished, the appropriations for propagation have not shown the usual increase as a result of the prevailing business depression.

The increased production of black bass signifies the interest that has attended the propagation of these fish in recent years. Approximately 30 per cent more black bass were distributed by the States in the past fiscal year than in the preceding year. The success in propagating black bass and other pond fishes is largely affected by weather conditions. Nevertheless, these fish can be raised very economically. In general black bass are valued second to trout as a game fish, but as some sections do not have trout waters, and as many persons prefer bass fishing to that for trout, the production of bass is rapidly increasing in importance and magnitude. The increase shown during the past year is indicative of a realization of possibilities in the propagation of black bass and suggests greatly increased efforts along this line in the future.

The species of fishes included under "other game fishes" and "commercial fishes" are not specified. As some fish, such as pike perch, yellow perch, and lake trout are classed under one or the other of these headings, figures covering such species are included under both headings, though there are no duplications.

SALVAGE OF FOOD FISHES

The total number of fishes handled in the rescue work in the Mississippi River region eclipsed all figures in the past. Favorable weather conditions and varying water stages permitted the capture of 182,534,861 stranded fishes, which were returned to the Mississippi River and its tributaries and other near-by waters. Approximately three tenths of 1 per cent of the total handled were utilized in filling applications for stocking waters removed from the vicinity of the rescue operations.

Number and disposition of fish rescued, fiscal year 1931

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish rescued
All stations:			
Buffalofish		12, 103, 543	12, 103, 543
Carp		25, 027, 800	25, 027, 800
Catfish	240, 758	82, 966, 912	83, 207, 670
Crappie	247, 415	28, 121, 527	28, 368, 942
Fresh-water drum		14, 474	14, 474
Largemouth black bass	381, 368	543, 366	924, 734
Pike and pickerel	275	813, 315	813, 590
Sunfish	73, 068	11, 334, 066	11, 407, 134
White bass		52, 768	52, 768
Yellow perch	33, 538	1, 990, 334	2, 023, 872
Miscellaneous		18, 590, 334	18, 590, 334
Total	976, 422	181, 558, 439	182, 534, 861
Summary by stations:			
Bellevue, Iowa	63, 173	34, 881, 899	34, 945, 072
Fairport, Iowa		25, 837, 720	25, 837, 720
Homer, Minn	254, 985	16, 124, 950	16, 379, 935
La Crosse, Wis	79, 057	10, 109, 363	10, 188, 420
Lynxville, Wis	334, 272	26, 709, 537	27, 043, 809
Marquette, Iowa	244, 935	67, 894, 970	68, 139, 905
Total	976, 422	181, 558, 439	182, 534, 861

TRANSFERS OF EGGS BETWEEN STATIONS

One of the principal advantages of a nation-wide propagation agency is its ability to transfer supplies of fish from a section of the country where they are abundant to another section where depletion is evident and where the species proposed for introduction would be a desirable acquisition. Fishes of wide natural range often appear in much greater numbers in some localities than in others. In such cases shipments of the fish alive, or in the egg stage if possible, are of great importance and value in the work of the bureau. Shipments of eggs are also made for the purpose of introducing new strains in the brood stock at the various hatcheries.

Shipments in the egg stage can be undertaken successfully in the case of trout, salmon, whitefish, pike perch, yellow perch, and a number of related species. Packed in specially constructed cases, the eggs require little care en route, making unnecessary the services of an attendant to accompany the shipment. Thousands of eggs may be packed safely in a small space with little danger of loss and such transfers constitute by far the most economical and simple procedure in the dissemination of fish. In general live fish are shipped only in connection with the distribution work and are recorded in the distribution tables in Part 2 of this report.

Transfer of eggs between stations, fiscal year 1931

Species	Number of eggs	From—	To—
Atlantic salmon	200, 000	Craig Brook, Me	Grand Lake Stream, Me.
	25, 000	do	Nashua, N. H.
Black-spotted trout	176, 000	Creede, Colo	Leadville, Colo.
	51, 000	Pyramid Lake, Nev	Do.
	193, 000	do	Saratoga, Wyo.
	1, 252, 000	do	Springville, Utah.
	250, 000	Yellowstone Park, Wyo	Birdsview, Wash.
	300, 000	do	Leadville, Colo
	25, 000	do	Pittsford, Vt.
	200, 000	do	Quilcene, Wash.
	350, 000	do	Springville, Utah.
Brook trout	308, 000	Berkshire, Mass	Nashua, N. H.
	200, 000	Craig Brook, Me	Grand Lake Stream, Me.
	700, 000	do	Erwin, Tenn.
	250, 000	do	La Crosse, Wis.
	300, 000	do	Manchester, Iowa.
	100, 000	do	Nashua, N. H.
	150, 000	do	Northville, Mich.
	150, 000	do	Charlevoix, Mich.
	150, 900	do	Wytheville, Va.
	96, 000	Meadow Creek, Mont	Bozeman, Mont.
	100, 000	Leadville, Colo	La Crosse, Wis.
	235, 000	do	Saratoga, Wyo.
	401, 000	Creede, Colo	Do.
	250, 000	St. Johnsbury, Vt	Ithaca, N. Y.
	173, 000	Pittsford, Vt	Do.
	47, 000	do	Nashua, N. H.
	900, 000	York Pond, N. H	Cape Vincent, N. Y.
	500, 000	do	Barneveld, N. Y.
	1, 100, 000	do	Northville, Mich.
	362, 000	do	St. Johnsbury, Vt.
	300, 000	do	White Sulphur Springs, W. Va.
	250, 000	Springville, Utah	Bozeman, Mont.
	250, 000	do	Saratoga, Wyo.
Chinook salmon	2, 000, 000	Battle Creek, Calif	Baird, Calif.
	1, 000, 000	Mill Creek, Calif	Do.
	304, 000	Clackamas, Oreg	Little White Salmon, Wash.
	3, 148, 000	Little White Salmon, Wash	Puget Sound stations.
	15, 000	do	Central station, Washington, D. C.
	750, 000	do	Clackamas, Oreg.
	780, 000	Rogue River, Oreg	Do.
Chum salmon	50, 000	Little White Salmon, Wash	Do.
Cisco	240, 000	Cape Vincent, N. Y	Central station, Washington, D. C.
	240, 000	do	Nashua, N. H.
Lake trout	7, 000	do	Do.
	3, 306, 000	Alpena, Mich	Charlevoix, Mich.
	50, 000	Charlevoix, Mich	Leadville, Colo.
Landlocked salmon	25, 000	Craig Brook, Me.	Bozeman Mont.
	8, 000	do	Salmon, Idaho.
	75, 000	do	Grand Lake Stream, Me.
	100, 000	do	York Pond, N. H.
	500, 000	Grand Lake Stream, Me	Craig Brook, Me.
	29, 000	do	Nashua, N. H.
	10, 000	do	Northville, Mich.
	75, 000	do	St. Johnsbury, Vt.
	25, 000	do	York Pond, N. H.
Loch Leven trout	110, 000	Bozeman, Mont	Cape Vincent, N. Y.
	350, 000	do	La Crosse, Wis.
	200, 000	do	Leadville, Colo.
	50, 000	do	Creede, Colo.
	33, 000	do	Neosho, Mo.
	50, 000	do	Northville, Mich.

Transfer of eggs between stations, fiscal year 1931—Continued

Species	Number of eggs	From—	To—
Loch Leven trout	702,000	Bozeman, Mont.	Puget Sound stations.
	200,000	do	Spearfish, S. Dak.
	250,000	do	Crawford, Nebr.
	315,000	do	Springville, Utah.
	56,000	do	St. Johnsbury, Vt.
	203,000	do	White Sulphur Springs, W. Va.
	5,540,000	Meadow Creek, Mont.	Bozeman, Mont.
	800,000	do	Puget Sound stations.
	30,000	Cape Vincent, N. Y.	Barneveld, N. Y.
Pike perch	3,000,000	Put in Bay, Ohio	Central station, Washington, D. C.
Rainbow trout	180,000	Bozeman, Mont.	Glacier Park, Mont.
	25,000	do	Cape Vincent, N. Y.
	75,000	do	Ogletown, Pa.
	50,000	do	Bourbon, Mo.
	50,000	do	Northville, Mich.
	200,000	do	Crawford, Nebr.
	2,655,000	Meadow Creek, Mont.	Bozeman, Mont.
	407,000	do	Glacier Park, Mont.
	100,000	do	Leadville, Colo.
	361,000	Manchester, Iowa	La Crosse, Wis.
	80,000	Neosho, Mo.	Bozeman, Mont.
	50,000	do	La Crosse, Wis.
	100,000	do	White Sulphur Springs, W. Va.
	300,000	Bourbon, Mo.	Bozeman, Mont.
	38,000	Spearfish, S. Dak.	Crawford, Nebr.
	100,000	Springville, Utah	Erwin, Tenn.
	103,000	do	Northville, Mich.
	200,000	do	Saratoga, Wyo.
	108,000	do	Central station, Washington, D. C.
	309,000	do	White Sulphur, Springs, W. Va.
Silver salmon	1,303,000	Baker Lake, Wash.	Birdsview, Wash.
	504,000	Quinault, Wash.	Clackamas, Oreg.
	1,919,000	do	Quilcene, Wash.
Sockeye salmon	100,000	Baker Lake, Wash.	Birdsview, Wash.
	1,005,000	Quinault, Wash.	Quilcene, Wash.
	1,187,000	Yes Bay, Alaska	Birdsview, Wash.
	1,868,000	do	Puget Sound stations.
Steelhead salmon	25,000	Applegate Creek, Oreg.	Big White Salmon, Wash.
	35,000	do	Charlevoix, Mich.
	50,000	do	St. Johnsbury, Vt.
	25,000	Quilcene, Wash.	Quinault, Wash.
Whitefish	21,280,000	Charlevoix, Mich.	Alpena, Mich.

Assignments of fish eggs to State and Territorial fish commissions, fiscal year 1931

State and species	Number
Arizona: Loch Leven trout	500,000
California: Atlantic salmon	25,000
Colorado:	
Chinook salmon	450,000
Lake trout	100,000
Loch Leven trout	574,000
Steelhead salmon	150,000
Connecticut:	
Loch Leven trout	200,000
Pike perch	2,500,000
Georgia: Rainbow trout	300,000
Hawaii: Steelhead salmon	40,000
Idaho:	
Black-spotted trout	300,000
Steelhead salmon	155,000
Maine:	
Atlantic salmon	3,000,000
Brook trout	170,000
Lake trout	250,000
Maryland: Rainbow trout	100,000
Massachusetts:	
Loch Leven trout	100,000
Rainbow trout	50,000
Michigan: Whitefish	11,000,000
Montana:	
Loch Leven trout	3,922,000
Rainbow trout	500,000
Nevada: Rainbow trout	300,000
New Mexico: Loch Leven trout	1,000,000
New York: Steelhead salmon	100,000
North Carolina: Rainbow trout	100,000
Oregon:	
Chinook salmon	7,756,000
Loch Leven trout	200,000
Sockeye salmon	1,507,000
Steelhead salmon	163,000
Pennsylvania:	
Common sucker	7,375,000
Pike perch	28,490,000
South Dakota: Loch Leven trout	200,000
Utah:	
Black-spotted trout	417,000
Chinook salmon	984,000
Lake trout	100,000
Loch Leven trout	500,000
Washington:	
Black-spotted trout	2,087,000
Chinook salmon	3,024,000
Humpback salmon	16,262,000
Wyoming:	
Black-spotted trout	1,950,000
Brook trout	200,000
Lake trout	250,000
Loch Leven trout	1,500,000
Rainbow trout	1,115,000
Total	99,966,000

SHIPMENTS TO FOREIGN COUNTRIES

Continuing the practice of recent years, trout eggs were shipped to Canada in exchange for eggs of the Atlantic salmon, the species furnished consisting of black-spotted and Loch Leven trout spawn. A shipment of 50,000 rainbow trout eggs was forwarded to England, and Portugal received a consignment of 100 top minnows. The total of 800,100 eggs and fish transferred to foreign countries during the year was unusually small as compared with shipments in 1930 and other years in the past.

Shipments of fish and fish eggs to foreign countries, fiscal year 1931

Country and species	Eggs	Fish
Canada:		
Black-spotted trout	500, 000	-----------
Loch Leven trout	250, 000	-----------
England: Rainbow trout	50, 000	-----------
Portugal: Top minnows	-----------	100
Total	800, 000	100

OUTPUT OF STATIONS AND SUBSTATIONS

During the fiscal year 1931 the bureau operated 38 stations and 49 substations, the latter including a number of locations which are used only for short periods as bases for egg-collecting and fish-rescue operations. In all cases the output shown is the result of closely regulated operations, which are conducted to the fullest capacity of equipment, limited only by natural conditions at the hatcheries and by available funds. A new substation was established near Ithaca, N. Y. In addition to the Federal stations and substations the following table lists the Arkansas State pond station at Lonoke, Ark. This station is operated under the supervision of an employee of the bureau, and a sufficient number of fish to fill applications in its vicinity are distributed by the bureau.

Stations, and substations operated and the output of each, fiscal year 1931

[Asterisk (*) denotes transfer of eggs. See table, pp. 641–642]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total[1]
Afognak, Alaska:				
Humpback salmon	10, 155, 000	-----------	1, 145, 300	11, 300, 300
Sockeye salmon	-----------	-----------	13, 033, 080	13, 033, 080
Steelhead salmon	33, 000	-----------	110, 000	143, 000
Baird, Calif.: Chinook salmon	-----------	300, 000	2, 775, 500	3, 075, 500
Battle Creek, Calif.—				
Chinook salmon	(*)	-----------	8, 640, 000	8, 640, 000
Mill Creek, Calif.—				
Chinook salmon	(*)	1, 500, 000	2, 616, 500	4, 116, 500
Baker Lake, Wash.:				
Silver salmon	(*)	-----------	-----------	-----------
Sockeye salmon	(*)	1, 323, 000	675, 000	1, 998, 000
Birdsview, Wash.—				
Black-spotted trout	-----------	-----------	41, 800	41, 800
Chinook salmon	69, 000	1, 335, 000	1, 077, 000	2, 481, 000
Humpback salmon	-----------	1, 051, 000	-----------	1, 051, 000
Silver salmon	-----------	3, 435, 000	271, 540	3, 706, 540
Sockeye salmon	-----------	-----------	84, 300	84, 300
Steelhead salmon	90, 000	-----------	281, 680	371, 680

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[1] Lost in transit 188,149.

Stations, and substations operated and the output of each, fiscal year 1931—Contd.

[Asterisk (*) denotes transfer of eggs. See table, pp. 641–642]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Baker Lake, Wash.—Continued.				
Duckabush, Wash.—				
Chinook salmon			748, 000	748, 000
Chum salmon		9, 246. 500		9, 246, 500
Silver salmon		1, 059, 000	210, 500	1, 269, 500
Steelhead salmon			45, 600	45, 600
Lake Crescent, Wash.—				
Sockeye salmon			995, 025	995, 025
Quilcene, Wash.—				
Black-spotted trout			176, 032	176, 032
Brook trout			64, 960	64, 960
Chinook salmon			743, 000	743, 000
Chum salmon		8, 143, 000		8, 143, 000
Silver salmon		1, 637, 000	272, 500	1, 909, 500
Steelhead salmon	*50, 000		204, 800	254, 800
Sultan, Wash.—				
Chinook salmon		106, 100	60, 000	166, 100
Silver salmon		777, 500	60, 000	837, 500
Steelhead salmon			73, 800	73, 800
Berkshire trout hatchery, Mass.:				
Brook trout	*2, 000		335, 715	337, 715
Catfish			2, 125	2, 125
Smallmouth black bass			366	366
Boothbay Harbor, Me.:				
Cod	1, 083, 306, 000			1, 083, 306, 000
Haddock	207, 059, 000			207, 059, 000
Winter flounder		2, 471, 262, 000		2, 471, 262, 000
Bozeman, Mont.:				
Black-spotted trout			2, 262, 040	2, 262, 040
Brook trout			175, 365	175, 365
Golden trout			[2] 25, 500	25, 500
Loch Leven trout	* 5, 116, 000		145, 483	5, 261, 483
Rainbow trout	* 1, 150, 000		1, 243, 410	2, 393, 410
Glacier Park, Mont.—				
Black-spotted trout			559, 200	559, 200
Rainbow trout			286, 700	286, 700
Meadow Creek, Mont.—				
Black-spotted trout			698, 500	698, 500
Brook trout	(*)			
Loch Leven trout	* 3, 879, 000	2, 726, 700	[3] 2, 464, 500	9, 070, 200
Rainbow trout	* 150, 000		1, 033, 800	1, 183, 800
Miles City, Mont.—				
Largemouth black bass			[4] 191, 180	191, 180
Catfish			[5] 4, 500	4, 500
Crappie			[6] 44, 475	44, 475
Sunfish			[7] 66. 725	66, 725
Cape Vincent, N. Y.:				
Brook trout		212, 000		212, 000
Cisco	(*)	63, 200, 000		63. 200, 000
Lake trout	(*)	498, 000		498, 000
Loch Leven trout	(*)			
Smallmouth black bass		81, 400		81, 400
Whitefish		[8] 10, 275, 000		10, 275, 000
Yellow perch		1, 100. 000		1, 100, 000
Barneveld, N. Y.—				
Brook trout			124, 974	124, 974
Loch Leven trout			28, 500	28, 500
Rainbow trout			48, 660	48. 660
Ithaca, N. Y.—				
Brook trout			115, 546	115, 546
Loch Leven trout			[9] 10, 750	10, 750
Swanton, Vt.—				
Common sucker	7, 375, 000			7, 375, 000
Pike perch	30, 990, 000	21, 080, 000		52, 070, 000
Yellow perch		[10] 40, 800, 000		40, 800, 000
Watertown, N. Y.—				
Brook trout		30, 000	291, 250	321, 250
Lake trout			36, 850	36, 850
Loch Leven trout			72, 400	72, 400
Rainbow trout			8, 450	8, 450

[2] In addition to 2,500 fingerling golden trout turned over to the State of Idaho in cooperative work.

[3] In addition to 200,000 fingerling Loch Leven trout turned over to the State of Montana in cooperative work.

[4] In addition to 121,400 fingerling largemouth black bass turned over to the State of Montana in cooperative work.

[5] Turned over to the State of Montana in cooperative work.

[6] In addition to 37,800 fingerling crappie turned over to the State of Montana in cooperative work.

[7] In addition to 59,950 fingerling sunfish turned over to the State of Montana in cooperative work.

[8] In addition to 3,500,000 whitefish fry turned over to the State of New York in cooperative work.

[9] Turned over to the State of New York in cooperative work.

[10] In addition to 5,400,000 pike perch fry turned over to the State of Vermont in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1931—Contd.

[Asterisk (*) denotes transfer of eggs. See table, pp. 641–642]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Central station, Washington, D. C.:				
Chinook salmon		8, 000		8, 000
Cisco		200, 000		200, 000
Pike perch		2, 800, 000		2, 800, 000
Rainbow trout			9, 000	9, 000
Smallmouth black bass		6, 000		6, 000
Fort Humphreys, Va.—				
Largemouth black bass			1, 468	1, 468
Shad		15, 600, 000		15, 600, 000
Yellow perch		[11] 71, 350, 000	5, 525	71, 355, 525
Lakeland, Md.—				
Largemouth black bass		[12] 17, 500	1, 900	19, 400
Crappie			3, 500	3, 500
Sunfish			37, 800	37, 800
Ogletown, Pa.—Brook trout			20, 120	20, 120
Clackamas, Oreg.:				
Brook trout			70, 500	70, 500
Chinook salmon	* 262, 000		3, 615, 000	3, 877, 000
Chum salmon			66, 000	66, 000
Rainbow trout			39, 000	39, 000
Silver salmon			180, 000	180, 000
Steelhead salmon			25, 000	25, 000
Applegate Creek, Oreg.—				
Silver salmon			449, 800	449, 800
Steelhead salmon	* 598, 000	[13] 24, 000	[13] 330, 100	952, 100
Big White Salmon, Wash.—				
Black-spotted trout			96, 000	96, 000
Brook trout			30, 400	30, 400
Chinook salmon	* 3, 434, 000		11, 582, 000	15, 016, 000
Rainbow trout			11, 900	11, 900
Steelhead salmon			106, 500	106, 500
Little White Salmon, Wash.—				
Chinook salmon	* 11, 929, 000	500, 000	15, 875, 000	28, 304, 000
Chum salmon	(*)		345, 000	345, 000
Silver salmon			96, 000	96, 000
Sockeye salmon			40, 500	40, 500
Rogue River, Oreg.—				
Chinook salmon	(*)	5, 000	[14] 4, 604, 000	4, 609, 000
Silver salmon			95, 550	95, 550
Steelhead salmon			161, 750	161, 750
Salmon, Idaho—				
Chinook salmon			4, 972, 000	4, 972, 000
Landlocked salmon			6, 800	6, 800
Rainbow trout	* 15, 000		[15] 690, 000	705, 000
Steelhead salmon	155, 000		106, 500	261, 500
Cold Springs, Ga.:				
Largemouth black bass		224, 250	650, 445	874, 695
Catfish			1, 815	1, 815
Sunfish			296, 100	296, 100
Valdosta, Ga.—				
Largemouth black bass			8, 680	8, 680
Sunfish			12, 020	12, 020
Craig Brook, Me.:				
Atlantic salmon	* 3, 025, 000		768, 300	3, 793, 300
Brook trout	* 169, 000		868, 360	1, 037, 360
Landlocked salmon	(*)		234, 900	234, 900
Grand Lake Stream, Me.—				
Atlantic salmon			170, 300	170, 300
Brook trout			161, 255	161, 255
Landlocked salmon	* 30, 000		288, 800	318, 800
Duluth, Minn.:				
Brook trout			214, 000	214, 000
Lake trout	740, 000	[16] 12, 795, 000	[17] 168, 000	13, 703, 000
Pike perch		7, 440, 000		7, 440, 000
Whitefish		6, 450, 000		6, 450, 000

[11] In addition to 25,050,000 yellow perch fry turned over to the State of Virginia in cooperative work.

[12] An additional amount of 20,000 largemouth black bass fry transferred to the Dumphries, Va., substation for rearing purposes.

[13] Turned over to the State of Oregon in cooperative work.

[14] In addition to 1,534,000 fingerling chinook salmon turned over to the State of Oregon in cooperative work.

[15] In addition to 40,000 fingerling rainbow trout turned over to the State of Idaho in cooperative work.

[16] In addition ot 4,000,000 lake trout fry turned over to the State of Michigan in cooperative work.

[17] In addition to 19,000 fingerling lake trout turned over to the State of Minnesota in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1931—Contd

Stations, substations, and species	Eggs	Fry	Fingerlings yearlings and adults	Total
Edenton, N. C.:				
Largemouth black bass		183, 000	63, 680	246, 680
Glut herring		50, 000, 000		50, 000, 000
Shad		650, 000		650, 000
Sunfish			16, 690	16, 690
Warmouth bass			330	330
Weldon, N. C.—				
Striped bass		9, 500, 000		9, 500, 000
Erwin, Tenn.:				
Largemouth black bass			35, 775	35, 775
Brook trout			374, 750	374, 750
Rainbow trout			349, 305	349, 305
Rock bass			11, 610	11, 610
Sunfish			26, 340	26, 340
Fairport, Iowa:				
Largemouth black bass			180, 693	180, 693
Buffalofish			155, 495	155, 495
Carp			1, 469, 017	1, 469, 017
Catfish			11, 007, 600	11, 007, 600
Crappie			5, 707, 525	5, 707, 525
Pike and pickerel			4, 748	4, 748
Smallmouth black bass			9, 040	9, 040
Sunfish			2, 419, 585	2, 419, 585
White bass			349	349
Yellow perch			1, 690	1, 690
Miscellaneous fishes			5, 049, 043	5, 049, 043
Gloucester, Mass.:				
Cod	178, 239, 000	77, 715, 000		255, 954, 000
Haddock	205, 418, 000	34, 951, 000		240, 369, 000
Pollock		240, 219, 000		240, 219, 000
Winter flounder		252, 615, 000		215, 615, 000
La Crosse, Wis.:				
Largemouth black bass			81, 155	81, 155
Brook trout		179, 500	961, 700	1, 141, 200
Buffalofish			658, 100	658, 100
Carp			1, 577, 300	1, 577, 300
Catfish			5, 543, 000	5, 543, 000
Crappie			504, 750	504, 750
Fresh-water drum			425	425
Loch Leven trout			299, 200	299, 200
Pike and pickerel			53, 650	53, 650
Rainbow trout			291, 400	291, 400
Sunfish			358, 930	358, 930
White bass			6, 280	6, 280
Yellow perch			196, 060	196, 060
Miscellaneous fishes			1, 208, 300	1, 208, 300
Bellevue, Iowa—				
Largemouth black bass			75, 000	75, 000
Buffalofish	29, 925, 000		1, 235, 400	31, 160, 400
Carp	34, 000, 000		4, 396, 000	38, 396, 000
Catfish			26, 252, 000	26, 252, 000
Crappie			885, 600	885, 600
Fresh-water drum			239	239
Pike and pickerel			3, 190	3, 190
Sunfish			245, 800	245, 800
White bass			2, 803	2, 803
Yellow perch			3, 772	3, 772
Miscellaneous fishes			1, 818, 000	1, 818, 000
Benzal, Ark.—				
Buffalofish		11, 044, 000		11, 044, 000
Green Lake, Wis.—				
Pickerel		3, 113, 000		3, 113, 000
Pike perch		43, 000		43, 000
Guttenburg, Iowa—				
Buffalofish	49, 815, 000			49, 815, 000
Carp	78, 995, 000			78, 995, 000
Harpers Ferry, Iowa—				
Buffalofish	12, 600, 000			12, 600, 000
Homer, Minn.—				
Largemouth black bass			285, 585	285, 585
Buffalofish			49, 990	49, 990
Carp			1, 192, 700	1, 192, 700
Catfish			2, 703, 165	2, 703, 165
Crappie			[18] 7, 057, 700	7, 057, 700
Fresh-water drum			810	810
Pike and pickerel			107, 400	107, 400
Sunfish			607, 500	607, 500

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[18] In addition to 14,400 fingerling crappie turned over to the State of Wisconsin and 27,000 turned over to the State of Minnesota in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1931—Contd.

[Asterisk (*) denotes transfer of eggs. See table, pp. 641–642]

Stations, substations, and species	Eggs	Fry	Fingerlings yearlings and adults	Total
La Crosse, Wis—Continued.				
Homer, Minn—Continued.				
White bass			15, 085	15, 085
Yellow perch			[19] 954, 450	954, 450
Miscellaneous fishes			3, 405, 550	3, 405, 550
Lynxville, Wis.—				
Largemouth black bass			[20] 136, 275	136, 275
Buffalofish			4, 670, 000	4, 670, 000
Carp			9, 435, 500	9, 435, 500
Catfish			[21] 7, 743, 065	7, 743, 065
Crappie			[22] 741, 932	741, 932
Pike and pickerel			16, 075	16, 075
Sunfish			[23] 544, 812	544, 812
White bass			500	500
Yellow perch			23, 650	23, 650
Miscellaneous fishes			4, 002, 000	4, 002, 000
Marquette, Iowa—				
Largemouth black bass			298, 840	298, 840
Buffalofish			746, 575	746, 575
Carp			6, 426, 300	6, 426, 300
Catfish			37, 236, 440	37, 236, 440
Crappie			16, 178, 960	16, 178, 960
Fresh-water drum			11, 000	11, 000
Pike and pickerel			333, 275	333, 275
Sunfish			6, 682, 500	6, 682, 500
White bass			22, 100	22, 100
Yellow perch			188, 615	188, 615
Miscellaneous fishes			15, 300	15, 300
Leadville, Colo.:				
Black-spotted trout			294, 100	294, 100
Brook trout	*325, 000		3, 263, 200	3, 588, 200
Lake trout			36, 000	36, 000
Loch Leven trout			215, 000	215, 000
Rainbow trout			152, 500	152, 500
Creede, Colo.—				
Black-spotted trout	*113, 000		342, 000	455, 000
Brook trout	*600, 000		528, 800	1, 128, 800
Loch Leven trout			12, 000	12, 000
Rainbow trout			390, 230	390, 230
Eagle Nest Lake, N. Mex.—				
Rainbow trout			175, 000	175, 000
Louisville, Ky.:				
Largemouth black bass		27, 000	5, 810	32, 810
Rock bass			8, 223	8, 223
Smallmouth black bass		612, 200	3, 730	615, 930
Sunfish			125	125
Mammoth Spring, Ark.:				
Largemouth black bass			169, 495	169, 495
Rock bass			8, 000	8, 000
Sunfish			20, 850	20, 850
Lonoke, Ark.—				
Largemouth black bass			225	225
Catfish			1, 450	1, 450
Crappie			5, 050	5, 050
Sunfish			19, 500	19, 500
Manchester, Iowa.:				
Brook trout			[24] 663, 500	663, 500
Rainbow trout	*75, 000		176, 700	251, 700
Rock bass			7, 000	7, 000
Nashua, N. H.:				
Atlantic salmon			5, 000	5, 000
Brook trout			357, 650	357, 650
Catfish			950	950
Landlocked salmon			31, 000	31, 000
Rainbow trout			13, 400	13, 400
Smallmouth black bass		23, 500	2, 935	26, 435
Neosho, Mo.:				
Largemouth black bass			69, 322	69, 322
Catfish			1, 200	1, 200
Crappie			58, 426	58, 426

NOTE.—The Lonoke (Ark.) station is owned by the State and is operated in conjunction with the bureau. The fish listed here are received by the bureau to fill applications in the vicinity of Lonoke.

[19] In addition to 750 fingerling yellow perch turned over to the State of Wisconsin in cooperative work.

[20] In addition to 19,985 fingerling largemouth black bass turned over to the State of Wisconsin in cooperative work.

[21] In addition to 163,000 fingerling catfish turned over to the State of Wisconsin in cooperative work.

[22] In addition to 58,000 fingerling crappie turned over to the State of Wisconsin in cooperative work.

[23] In addition to 17,210 fingerling sunfish turned over to the State of Wisconsin in cooperative work.

[24] In addition to 700 fingerling brook trout turned over to the State of Iowa in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1931—Contd.

[Asterisk (*) denotes transfer of eggs. See table, pp. 641–642]

Stations, substations, and species	Eggs	Fry	Fingerlings yearlings and adults	Total
Neosho, Mo.—Continued.				
Loch Leven trout			8,000	8,000
Rainbow trout	*645,000		[25] 240,206	885,206
Rock bass			2,770	2,770
Sunfish			34,766	34,766
Bourbon, Mo.—				
Rainbow trout	*1,510,000			1,510,000
Langdon, Kans.—				
Largemouth black bass			99,765	99,765
Catfish			14,850	14,850
Crappie			14,484	14,484
Sunfish			81,050	81,050
Yellow perch			748	748
Northville, Mich.:				
Brook trout			1,134,970	1,134,970
Landlocked salmon			13,000	13,000
Loch Leven trout			10,000	10,000
Rainbow trout			198,900	198,900
Smallmouth black bass		6,000	[26] 86,500	92,500
Sunfish			30	30
Alpena, Mich.—				
Lake trout	(*)	1,300,000	175,000	1,475,000
Whitefish	10,960,000	11,950,000		22,910,000
Charlevoix, Mich.—				
Brook trout		146,240		146,240
Lake trout	*100,000	[27] 9,852,000		9,952,000
Steelhead salmon			60,900	60,900
Whitefish	(*)	[28] 44,500,000		44,500,000
Orangeburg, S. C.:				
Largemouth black bass			248,300	248,300
Catfish			1,220	1,220
Crappie			23,300	23,300
Sunfish			5,825	5,825
Warmouth bass			15,020	15,020
Georgetown, S. C.—				
Shad		104,000		104,000
Jacksonboro, S. C.—				
Shad		2,884,000		2,884,000
Yemassee, S. C.—				
Shad		252,000		252,000
Put in Bay, Ohio.:				
Pike perch		133,000,000		133,000,000
Whitefish		73,280,000		73,280,000
Quinault, Wash.:				
Chinook salmon		87,000		87,000
Silver salmon	*226,000			226,000
Sockeye salmon	*1,708,000	13,300,000	4,030,500	19,038,500
St. Johnsbury, Vt.:				
Brook trout	*250,000	892,900	13,790	1,156,690
Landlocked salmon		38,000		38,000
Loch Leven trout		21,000		21,000
Steelhead salmon		17,535	44,600	62,135
Pittsford, Vt.—				
Black-spotted trout	21,000	46,415	[29] 17,900	85,315
Brook trout	(*)		126,240	126,240
Grayling			[29] 3,000	3,000
Rainbow trout	10,000		[30] 18,075	28,075
Steelhead salmon			1,800	1,800
York Pond, N. H.—				
Brook trout	*50,000	330,750	[31] 289,700	670,450
Landlocked salmon			30,000	30,000
San Marcos, Tex.:				
Largemouth black bass		323,725	116,950	440,675
Catfish			1,735	1,735
Crappie			17,685	17,685
Rio Grande perch			19,165	19,165
Rock bass			4,550	4,550
Sunfish			22,055	22,055
Warmouth bass			2,400	2,400

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[25] In addition to 77,000 fingerling rainbow trout turned over to the State of Missouri in cooperative work.

[26] In addition to 500 fingerling smallmouth black bass turned over to the State of Michigan in cooperative work.

[27] In addition to 9,922,000 lake trout fry turned over to the State of Michigan in cooperative work.

[28] In addition to 16,830,000 whitefish fry turned over to the State of Michigan in cooperative work.

[29] Turned over to the State of Vermont in cooperative work.

[30] In addition to 250 fingerling rainbow trout turned over to the State of Vermont in cooperative work.

[31] In addition to 15,000 fingerling brook trout turned over to the State of Vermont in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1931—Contd.

[Asterisk (*) denotes transfer of eggs. See table, pp. 641–642]

Stations, substations, and species	Eggs	Fry	Fingerlings yearlings and adults	Total
San Marcos, Tex.—Continued.				
Lake Worth, Tex.—				
Largemouth black bass		4,000	46,000	50,000
Catfish			1,030	1,030
Crappie			16,435	16,435
Rio Grande perch			29,200	29,200
Sunfish			60,900	60,900
Warmouth bass			20,100	20,100
Saratoga, Wyo.:				
Black-spotted trout			174,100	174,100
Brook trout			498,300	498,300
Loch Leven trout			[32] 570,500	570,500
Rainbow trout			364,500	364,500
Spearfish, S. Dak.:				
Brook trout			828,894	828,894
Loch Leven trout			500,946	500,946
Rainbow trout	*366,000		223,400	589,400
Crawford, Nebr.—				
Brook trout			31,575	31,575
Catfish			21,000	21,000
Loch Leven trout			[33] 165,000	165,000
Rainbow trout			51,000	51,000
Sunfish			51,000	51,000
Yellow perch			18,100	18,100
Springville, Utah:				
Black-spotted trout			116,500	116,500
Brook trout	(*)		193,000	193,000
Loch Leven trout			110,500	110,500
Rainbow trout	*602,000		1,649,800	2,251,800
Pyramid Lake, Nev.—				
Black-spotted trout	*746,000			746,000
Tupelo, Miss.:				
Largemouth black bass		215,000	157,470	372,470
Sunfish			343,170	343,170
Aliceville, Ala.—				
Largemouth black bass			1,635	1,635
Sunfish			65,950	65,950
White Sulphur Springs, W. Va.:				
Largemouth black bass			77,206	77,206
Brook trout			[34] 1,117,700	1,117,700
Loch Leven trout			[35] 343,800	343,800
Rainbow trout	627,000		[36] 310,200	937,200
Rock bass			6,600	6,600
Sunfish			19,800	19,800
Woods Hole, Mass.:				
Cod	70,087,000	115,951,000		186,038,000
Mackerel	1,611,000	8,580,000		10,191,000
Winter flounder	263,652,000	917,139,000		1,180,791,000
Wytheville, Va.:				
Largemouth black bass		23,000	1,425	24,425
Brook trout			[37] 222,775	222,775
Catfish			500	500
Rainbow trout			[38] 328,360	328,360
Rock bass			8,500	8,500
Smallmouth black bass			900	900
Sunfish			36,750	36,750
Marion, Va.—				
Brook trout			23,000	23,000
Rainbow trout			3,000	3,000
Yellowstone Park, Wyo.:				
Black-spotted trout	*5,388,000		5,002,500	10,390,500
Grayling	1,000,000			1,000,000
Yes Bay, Alaska:				
Chum salmon		85,000		85,000
Humpback salmon	6,107,000	261,000		6,368,000
Sockeye salmon	*1,868,000		36,482,000	38,350,000

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[32] In addition to 4,500 fingerling Loch Leven trout turned over to the State of Wyoming in cooperative work.

[33] In addition to 30,000 fingerling Loch Leven trout turned over to the State of Nebraska in cooperative work.

[34] In addition to 5,000 fingerling brook trout turned over to the State of Virginia and 362,000 turned over to the State of West Virginia in cooperative work.

[35] In addition to 25,000 fingerling Loch Leven trout turned over to the State of West Virginia in cooperative work.

[36] In addition to 25,000 fingerling rainbow trout turned over to the State of West Virginia in cooperative work.

[37] In addition to 30,800 fingerling brook trout turned over to the State of Virginia in cooperative work.

[38] In addition to 22,900 fingerling rainbow trout turned over to the State of Virginia and 85,800 turned over to the State of West Virginia in cooperative work.

EGG COLLECTIONS

The majority of the fish handled by the bureau are distributed in the same fiscal year in which the eggs are collected. Thus the same tendencies are shown each year in both the distribution and egg collection tables. Variations between egg collections of the past two years are reflected mainly in the comparatively low collection of cod and pollock eggs. The collection of grayling eggs at Grebe Lake, Wyo., and of striped bass eggs at Weldon, N. C., marks the renewal of operations with species which were not handled during the fiscal year 1930.

Comparison of egg collections, fiscal years 1931 and 1930

Species	1931	1930	Species	1931	1930
Buffalofish	103, 162, 000	35, 775, 000	Black-spotted trout	25, 417, 000	18, 915, 000
White sucker	7, 375, 000	6, 750, 000	Loch Leven trout	20, 502, 700	19, 391, 200
Carp	113, 250, 000	98, 625, 000	Lake trout	68, 649, 800	58, 511, 420
Shad	19, 122, 000	7, 011, 000	Brook trout	13, 005, 150	17, 094, 660
Glut herring	104, 715, 000	30, 700, 000	Grayling	1, 000, 000	
Whitefish	359, 122, 000	240, 638, 000	Pike perch	564, 240, 000	396, 325, 000
Cisco	92, 520, 000	75, 490, 000	Yellow perch	131, 640, 000	190, 490, 000
Chinook salmon	64, 770, 500	27, 400, 600	Striped bass	13, 370, 000	
Chum salmon	19, 560, 000	26, 562, 000	Cod	1, 632, 253, 000	2, 425, 992, 000
Humpback salmon	20, 726, 670	6, 918, 800	Haddock	421, 524, 000	394, 575, 000
Silver salmon	9, 333, 500	7, 433, 500	Pollock	388, 130, 000	1, 028, 433, 000
Sockeye salmon	54, 999, 270	54, 160, 120	Winter flounder	4, 333, 487, 000	3, 637, 839, 000
Steelhead salmon	3, 670, 430	4, 975, 300	Mackerel	12, 050, 000	17, 759, 000
Landlocked salmon	1, 241, 720	592, 970			
Rainbow trout	22, 327, 230	21, 255, 090	Total	8, 621, 163, 970	8, 849, 612, 660

Egg-collecting stations

Station	Period of—	Species handled
Baker Lake, Wash.:		
Brinnon, Wash	Nov. 24–Jan. 19	Chum salmon.
Boothbay Harbor, Me.:		
Damiscove, Me	Apr. 7–June 1	Cod and haddock.
Ebenecook Harbor, Me	Mar. 3–Apr. 16	Winter flounder.
Johns Bay, Me	Mar. 12–Apr. 17	Do.
Knubble Bay, Me	Mar. 6–Apr. 7	Do.
Linekins Bay, Me	Mar. 9–Apr. 16	Do.
New Harbor, Me	Mar. 19–June 1	Cod and haddock.
Robin Hoods Cove, Me	Mar. 3–Apr. 7	Winter flounder.
Sheepscott Bay, Me	Apr. 7–June 19	Cod and haddock.
Sheepscott River, Me	Mar. 3–Apr. 13	Winter flounder.
Cape Vincent, N. Y.:		
Chaumont Bay, N. Y	Nov. 12–Dec. 1	Cisco.
Irondequoit Bay, N. Y	Dec. 3–Dec. 15	Do.
Sodus Bay, N. Y	Nov. 15–Dec. 1	Do.
Stony Island, N. Y	Oct. 15–Nov. 2	Lake trout.
Clackamas, Oreg.:		
Upper Clackamas River, Oreg	Sept. 3–Oct. 8	Chinook salmon.
Williams Lake, Idaho	Apr. 29–June 12	Rainbow trout.
Duluth, Minn.:		
Bemidji, Minn	Apr. 16–Apr. 30	Pike perch.
Betsey River, Mich	Oct. 13–Oct. 30	Lake trout.
Big Traverse Bay, Mich	do	Do.
Copper Harbor, Mich	Oct. 1–Oct. 12	Do.
Gay, Mich	Oct. 13–Oct. 30	Do.
Grand Marais, Mich	Oct. 22–Nov. 6	Do.
Huron Island, Mich	Oct. 13–Oct. 27	Do.
Isle Royale (Mich.) ports	Oct. 1–Nov. 24	Do.
	Oct. 25–Nov. 13	Whitefish.
Manitou Island, Mich	Oct. 13–Oct. 23	Lake trout.
Marquette, Mich	Oct. 16–Nov. 4	Do.
Munising, Mich	Oct. 18–Oct. 31	Do.
Portage Entry, Mich	Oct. 13–Oct. 28	Do.
Portage Lake Ship Canal, Mich	Oct. 8–Oct. 25	Do.
Gloucester, Mass.:		
Boars Head, N. H	Dec. 1–May 10	Cod.
Marblehead, Mass	Dec. 20–Feb. 28	Do.
Plymouth, Mass	Nov. 1–Mar. 25	Cod and pollock.
Rockport, Mass	Nov. 1–May 10	Pollock, cod, and haddock.

Egg-collecting stations—Continued

Station	Period of—	Species handled
Leadville, Colo.:		
Continental Reservoir, Colo	May 12–June 19	Black-spotted trout.
Eagle Nest Lake, N. Mex	Apr. 1–June 30	Rainbow trout.
Hartner Lakes, Colo	Oct. 18–Nov. 1	Brook trout.
Mount Home Reservoir, Colo	Apr. 23–June 18	Rainbow trout.
Mount Massive Club Lakes, Colo	Oct. 10–Dec. 6	Brook and Loch Leven trout.
Mount Princeton Lakes, Colo	Oct. 18–Nov. 26	Brook trout.
Rainbow Development Lakes, Colo	Oct. 10–Nov. 15	Do.
Turquoise Lake, Colo	Oct. 16–Nov. 29	Brook and Loch Leven trout.
Nashua, N. H.: Lebanon, N. H	Apr. 21–May 2	Rainbow trout.
Northville, Mich.:		
Beaver Island, Mich	Nov. 2–Nov. 26	Lake trout and whitefish.
Black River, Mich	Oct. 27–Nov. 24	Do.
Cheboygan, Mich	Oct. 24–Nov. 22	Do.
Detour, Mich	Oct. 28–Nov. 8	Lake trout.
Epoufette, Mich	Nov. 6–Nov. 21	Whitefish.
Leland, Mich	Nov. 10–Nov. 26	Lake trout.
Middle Island, Mich	Oct. 27–Nov. 3	Do.
Naubinway, Mich	Nov. 7–Nov. 15	Whitefish.
Northport, Mich	Nov. 8–Nov. 26	Lake trout and whitefish.
Oscoda, Mich	Oct. 28–Nov. 10	Lake trout.
Ossineke, Mich	Oct. 28–Nov. 27	Lake trout and whitefish.
Presque Isle, Mich	Oct. 26–Nov. 15	Do.
Rockport, Mich	Oct. 27–Nov. 29	Do.
Rogers City, Mich	Nov. 11–Nov. 17	Whitefish.
St. Ignace, Mich	Oct. 25–Nov. 16	Lake trout and whitefish.
Put in Bay, Ohio:		
Catawba Island, Ohio	Nov. 7–Nov. 27	Whitefish.
Middle Bass, Ohio	Nov. 8–Nov. 27	Do.
North Bass, Ohio	do	Do.
Port Clinton, Ohio	Nov. 6–Nov. 28	Do.
	Apr. 7–May 5	Pike perch.
Toledo, Ohio	Nov. 6–Nov. 28	Whitefish.
	Apr. 8–May 5	Pike perch.
Saratoga, Wyo.:		
Big Creek Lakes, Colo	Sept. 2–Nov. 3	Brook trout.
Lost Creek, Wyo	Mar. 19–June 26	Rainbow trout.
Springville, Utah:		
Fish Lake, Utah	Nov. 7–Nov. 23	Brook trout.
	Apr. 10–May 25	Rainbow trout.
Pyramid Lake, Nev	Feb. 6–May 9	Black-spotted trout
Woods Hole, Mass.:		
Buzzards Bay, Mass	May and June	Mackerel.
Lamberts Cove, Mass	do	Do.
Waquoit, Mass	January–April	Winter flounder.

FISH-CULTURAL NOTES

FIVE-YEAR EXPANSION PROGRAM

In May, 1930, Congress enacted a law providing for the construction of 30 new or expanded fish-cultural acitvities, and also for a general expansion of other projects of the bureau. Appropriations were made to cover the construction work authorized for the fiscal year beginning July 1, 1930, and sites for stations were selected at Dexter, N. Mex., Natchitoches, La., and in the Hagerman Valley, Idaho. Locations were also decided upon for the establishment of substations at Lake Mills, Wis., Leadville, Colo., York Pond, N. H., Leetown, W. Va., and in the vicinity of Virginia City, Mont. Plans for the construction of these stations and substations were prepared and the work of establishment had been started at two of the locations before the close of June, 1931.

The 5-year program includes the location and construction of 11 stations, 15 substations, and 2 experimental trout and bass stations, the purchase of 3 sites of stations now in operation, and the construction of 2 distribution cars. The provision of these stations and substations will reduce the necessity for long-distance shipments of fish. It will place the bureau in a position to greatly extend the cooperative nursery work in various sections of the country, and the scope of effective distribution by which the bureau endeavors to overcome depletion of the game fishes in suitable waters will be enlarged.

FISH FOOD

Experiments conducted during the year at Pittsford, Vt., emphasized the fact that certain dried products in combination with fresh meats can be used with results equal to or better than those obtained when fresh meats alone are used. A fine growth and remarkable coloration followed the feeding of trout on a diet of dried salmon eggs in combination with liver.

BLACK-SPOTTED TROUT EGG COLLECTIONS AT PYRAMID LAKE, NEV.

Pyramid Lake, Nev., is inhabited by a strain of unusually large black-spotted trout which spawn earlier in the spring than do most of the other strains. For some years the State of Nevada collected eggs in this field, but the lake is on an Indian reservation and the work met with much opposition from the Indians, who had been accustomed to net the spawning adults and sell them. The difficulties encountered by the State from this source necessitated a discontinuance of operations for a time. As the field was considered a valuable source of black-spotted trout eggs, and as protection of the adult fish appeared essential for the perpetuation of the species in Pyramid Lake, collections were resumed in the spring of 1931 by the bureau, acting in cooperation with the State authorities, and about 4,900,000 eggs were secured. Thirty per cent of the resulting fry will be returned to the lake as fingerling fish from 1½ to 3 inches long. The past season being the first that the bureau has operated throughout the entire spawning period, precautionary measures to insure the successful carrying out of the undertaking were effected with the Indian Service, the Indians of the reservation, and the State of Nevada.

BASS PONDS AT CAPE VINCENT, N. Y.

Past operations at this station have centered on activities connected with the propagation of the lake fishes and trout. Within the past two years ponds for the propagation of pond fishes, mainly smallmouth black bass, have been constructed, and the Cape Vincent station now constitutes the bureau's first completely equipped smallmouth black bass rearing plant in the Northeast. Its output of that species during 1931 ranked next to those of the Northville (Mich.) and Louisville (Ky.) stations.

GRAYLING OPERATIONS AT GREBE LAKE, WYO.

The grayling is known as one of the most beautiful and active of game fishes. It furnishes some of the most interesting fly fishing obtainable. It is little known, however, outside its natural ranges in the northern Rocky Mountain and Great Lakes regions, since the various attempts made to transplant it have met with little success. Moreover, as young grayling are difficult to feed and handle during their early stages, the fish have not been reared extensively. During the past fiscal year a sufficient number of adult grayling were captured to yield a collection of 1,000,000 eggs. These were fertilized and planted in the egg stage in the waters from which the fish were taken. The captures were made in connection with an attempt to secure data on the possibility of collecting rainbow trout eggs in Grebe Lake in the Yellowstone National Park. The success of this preliminary work has encouraged the conduct of future grayling operations in Grebe Lake, and with this end in view plans are being made to provide hatching facilities and to construct more permanent racks and traps for the capture of adult grayling.

SUCCESSFUL POND-FISH WORK IN MONTANA

During 1931, the second year of its operation, the Lake Garberson substation, located near Miles City, Mont., surpassed the impressive record of its first year's work in the production of pond fishes. As the operations in this field were on an experimental basis, a number of the more important improvements, including the installation of a permanent water supply, were held in abeyance until a decision could be reached as to whether expenditures for permanent improvements would be justified. The unfinished condition of the plant, together with the effects of the drought, caused fluctuations in the water level and permitted the flooding of only a fractional part of the pond area. This, of course, resulted in a smaller output of fish than should be realized after the station has been fully completed. The work at Lake Garberson is conducted cooperatively with the Montana Fish and Game Commission, and the greater part of the year's production of 316,855 largemouth black bass, crappie, sunfish, and catfish was received by the State.

During the fiscal year a pond was formed alongside Lake Garberson by the construction of a dam. A drainage and supply system was provided and the initial production of the new enclosure, to be known as Lake Keough, will appear in the fall of 1931. The output of this lake, with the bureau's share of the Lake Garberson production, will constitute a large percentage of the pond fishes distributed by the Bureau of Fisheries in the Northwest.

FISH HATCHERY SITE, MOUNT RAINIER, WASH.

With the exception of the Yellowstone and Glacier Parks, the distribution of fish in the national parks has been limited greatly by a lack of near-by producing stations. This condition was further stressed in Mount Rainier National Park by the fact that no trout stations are operated by the bureau in the State of Washington. For this reason the recent selection of a trout hatchery site at Silver Spring, within the park boundaries, promises to relieve much of the strain formerly experienced in the stocking of waters throughout this region. Preparations for the construction of this hatchery were being made as the fiscal year ended.

EFFECTS OF THE DROUGHT

The majority of the bureau's fish-cultural stations are so located that adequate water for their operation is available throughout the year. During the past year, however, the volume of lakes and streams in all parts of the country became so greatly reduced by the prevailing drought as to materially curtail the water supply to the hatcheries. The result was a partial suspension of operations in many fields, while at other points auxiliary water supply lines had to be installed to prevent the loss of fish and eggs on hand. These conditions affected the size of the output and necessitated the planting of thousands of fish at an earlier stage than was desirable, in order to prevent overcrowding of the station ponds. The drought brought about suitable conditions for the capture of fish in the rescue work in the Mississippi River region, but the continued low water levels at the close of the fiscal year offered little prospect for a successful season during the summer of 1931.

COMMERCIAL SPECIES

Commercial species are propagated in an effort to counterbalance the drain that commercial fishing places on the fishery resources. Sufficient depletion has been undergone to make it apparent that replacement is necessary if the supply of food fish in public waters is to be maintained. Such replacement is most successfully accomplished by fish-cultural means, even where the assistance rendered can include only the artificial impregnation of eggs.

During the 1931 fiscal year the numbers of commercial species propagated were generally increased, although there were large decreases in the numbers of eggs handled in the case of the cod, pollock, carp, and buffalofish. Under favoring weather conditions unusually large numbers of pike perch, cisco, and whitefish eggs were obtained in the Great Lakes region.

PACIFIC SALMON

Large numbers of chinook salmon ascended the streams to spawn in the California and Columbia River fields. This allowed a very satisfactory collection of chinook salmon eggs in these sections, which greatly exceeded the figures of 1930. In Puget Sound the past season was an "off" season for the run of hump-back salmon, but large numbers of eggs of this species were transferred from the Alaska field in an endeavor to establish a supply of humpback salmon. Total collections in all fields exceeded those of the previous fiscal year.

AFOGNAK (ALASKA) STATION

[HARRY F. JOHNSTON, Superintendent]

The run of sockeye salmon into Letnik Lake began June 19 and continued until August, during which time 2,649 female fish were handled and 6,347,270 eggs produced. In August and September 13,671,270 eggs of the humpback salmon were taken, and on reaching the eyed stage 10,155,776 of this number were forwarded to the Washington State Department of Fisheries and Game. During the spring 32,826 steelhead salmon eggs were collected and planted in the eyed stage in Letnik River. In connection with the rearing operations 560 silver salmon, salted in the previous fall, were used as a food supply. On attaining the No. 1 fingerling size all sockeye salmon on hand were planted in Letnik Lake, while the humpback salmon fingerlings were liberated in Letnik River.

The year's construction work included the building of a new water tank and a garage. The arrangement of the latter permits the housing of the station truck and tractors and leaves ample room for repair work. From 400 trees cut on the station reservation sufficient lumber was prepared for the construction of a dock and shipways on Letnik Bay. A new pilot house and deck and a rearranged interior were provided for the bureau's boat *Red Wing*, and a complete new counting weir was installed at the foot of Letnik Lake. Numerous repairs of a minor nature were made to the station buildings and equipment.

YES BAY (ALASKA) STATION

[A. T. LOOFF, Superintendent]

Fish-cultural work at this station was devoted mainly to the handling of sockeye salmon, with incidental collections of eggs of the humpback and chum salmon and the rearing of a small lot of eastern brook trout for distribution in Alaska waters. Salmon eggs and milts were again used with marked success to feed the stock of young sockeye salmon. The material was obtained from commercial fishing establishments in the district and kept in cold storage until needed. The 8,000,000 sockeye salmon fingerlings on hand in the slough pond at the beginning of the year were held until September 8 and then liberated in Lake McDonald. At the time of liberation they had reached a length of 3 inches.

The season's spawning operations yielded a total of 27,469,000 sockeye salmon eggs, 7,055,000 humpback salmon eggs, and 100,000 chum salmon eggs. On attaining the eyed stage 3,055,000 of the sockeye salmon and 6,107,000 humpback salmon eggs were forwarded to the bureau's headquarters at Seattle, Wash., for reshipment to applicants in Washington and Oregon. From the retained stock 22,480,000 sockeye salmon fingerlings No. 2, 261,000 humpback salmon advanced fry, and 85,000 chum salmon advanced fry were produced and released in Lake McDonald. As will be noted from a study of the above figures, the losses on this stock during the time it was held were not above normal. The released salmon were fed in the slough pond until the end of the year.

The principal item of repair work undertaken during the year was the renewal of foundation posts, sills, studding, floor joists, and flooring in the hatchery building. This part of the building had become badly decayed and at the close of the year the work was in a half-completed condition. It is planned to complete it early in the coming fiscal year. Various minor repairs and improvements were made to ponds, buildings, and equipment.

BIRDSVIEW (WASH.) STATION AND SUBSTATIONS

[JOSEPH KEMMERICH, Superintendent]

Operations in this field were conducted throughout the entire year at the five permanently located stations comprising this group. In addition, the Walcotts Slough trap at Brinnon, Wash., was operated during the egg-collecting season; sockeye salmon were reared at the Lake Crescent (Wash.) State hatchery, and silver salmon and steelhead salmon eggs were secured for the Birdsview station at the Baker River dam at Concrete, Wash. Eggs of all the Pacific salmons excepting the humpback were collected. The run of early chum salmon in the Duckabush River was less than 50 per cent of normal, but the egg collections of silver salmon, sockeye salmon and steelhead salmon exceeded those of last year. The total collection of eggs of all species, amounting to 28,532,800, fell short of last year's take by 8,884,700, the decreased results being due in part to the small run of early chum salmon in the Duckabush River and to the fact that 1930 was the "off" year for humpback salmon on Puget Sound. In addition to the eggs collected 9,698,832 eggs of various species of salmon and trout were received by transfer from other fields and handled with the local collections. Eyed steelhead and chinook salmon eggs to the number of 234,250 were forwarded to various points in the State of Washington and to Hawaii. A successful distribution of steelhead salmon, eastern brook trout, and black-spotted trout was made from the Birdsview and Quilcene stations to waters of the Mount Rainier National Park. Throughout the greater part of the year the Birdsview station cooperated with the Skagit County game commission in the hatching and rearing of trout.

The sockeye salmon run in Baker River was the smallest experienced since the power dam was installed, but a greater percentage of the fish arrived at Baker Lake than in previous years and the egg collection was proportionately greater. The more favorable results are attributed to various improvements made in the catching and hoisting device and to the established policy of reducing to a minimum the time that the fish are confined therein.

Continued success was had in the feeding of fluke-infected and treated liver, and it again resulted in a considerable saving in the cost of fish food. The marking experiment begun at the Birdsview station in the fall of 1929, to determine whether age or size at time of liberation is the factor governing the return of sockeye salmon, was continued. The site selected for the establishment of a new hatchery in the Mount Rainier National Forest was obtained from the

Forest Service. Further investigation of streams and spawning grounds was conducted during the year. Silver salmon and steelhead salmon eggs were successfully collected in Baker River below the dam and transferred to the Birdsview station for incubation. A highway to the Baker Lake station from the Mount Baker Forest boundary is now being constructed by the United States Bureau of Public Roads, and by the fall of 1932 the old pack-horse trail between Baker Lake and Concrete can be abandoned. Further effort was made during the year to establish a run of sockeye salmon in the Lyre River.

Birdsview (*Wash.*) *station.*—Minor repairs and improvements were made to two of the station cottages, and the interiors of the mess-house cottage and small cottage were repainted. Two new Ford trucks and a concrete mixer were added to the station equipment. The year opened with a considerable number of sockeye salmon, steelhead salmon, and black-spotted trout fingerlings on hand. Fifty thousand of the first-named species were set aside for the continuation of the experiment to determine whether age or size of the fish at the time of release is the factor governing its return, and 34,200 were planted in streams having lakes at their head. The black-spotted trout fingerlings and a number of the steelhead salmon were distributed in Mount Rainier National Park waters. The remainder of the latter species were distributed locally and supplied to applicants late in the fall.

On account of low water in Grandy Creek during the early fall, egg collections in the course of the year were confined to operations with the silver and steelhead salmons, of which only small numbers were obtained as compared with previous years. However, silver salmon eggs for stocking the Birdsview hatchery to the number of 1,740,000 were collected in Baker River in December and the stock of steelhead eggs from local waters was supplemented to the extent of 330,000 secured from the same source. The station also received and handled eggs of the sockeye, chinook, and humpback salmon and of the black-spotted and rainbow trout. Shipments of chinook and steelhead salmon eggs were furnished by the station to applicants in the State of Washington and in Hawaii. Feeding operations were conducted to the full capacity of the station and fluke-infected liver was successfully used, at a considerable saving in cost as compared with fresh liver. All fry and fingerling fish produced were liberated locally except 98,700 sockeye salmon, retained for the marking experiment, 71,500 rainbow trout fry, and all of the steelhead eggs, fry, and fingerlings. This stock was carried over the year for distribution later in the season.

Baker Lake (*Wash.*) *substation.*—Such minor repairs were made to buildings and equipment as were necessary for the proper maintenance and operation of the station. Of the 1,036 sockeye salmon passed over the dam at Concrete, 859 were caught at the station and from them 1,183,000 eggs were obtained. Of these 100,000 in the eyed stage were transferred to the Birdsview station. The fingerling fish produced from the remainder, together with 955,000 fry resulting from a shipment of sockeye eggs received from the Yes Bay (Alaska) station, were liberated in Baker Lake prior to the close of the fiscal year. Of the 16,263 silver salmon passed over the dam at Concrete, 2,103 were caught in the station trap. From them 1,322,000 eggs were secured and transferred in the eyed stage to the Birdsview station. For the purpose of stocking a number of mountain lakes in the vicinity of the station, 50,000 eastern brook trout eggs were received during the winter from the Washington State Fisheries Department; and 40,000 Loch Leven trout eggs, for stocking Baker Lake, were received from the Bozeman (Mont.) station. The fingerlings resulting from these two lots of eggs were on hand at the close of the year.

Duckabush (*Wash.*) *substation.*—All station buildings and equipment were maintained in good condition throughout the year. During August a temporary rack was again installed near the mouth of the Duckabush River for securing eggs of the early-run chum salmon, and when the run was over it was again removed from the river. About 6,000 pounds of salted salmon were prepared for fish food, for use at the Hoods Canal and Birdsview stations. The early run of chum salmon in Duckabush River did not exceed 50 per cent of normal. Practically all of the 5,529,000 eggs secured from the late run of this species were collected at Walcotts Slough, operated conjointly by the Duckabush and Quilcene stations. Only 237,000 eggs of the silver salmon and 37,000 of the steelhead were obtained at the permanent trap. The supply of the former species was increased by the receipt of 1,075,760 eggs from the Quinault station; and 753,000 eggs of the chinook salmon were shipped in from the Little White Salmon hatchery, with the view of continuing the experiment undertaken in 1925 for increasing the run of that species in the Duckabush and Docewallips Rivers. All fry and fingerlings produced during the year were liberated in these rivers and in Walcotts Slough with the exception of 19,700 steelhead fry and fingerlings, which remained on hand at the close of the year.

Quilcene (Wash.) substation.—Immediately after July 1 all traps and equipment were put in condition for the season's fish-cultural operations. Minor repairs were made to ponds and buildings, and a small office and storeroom building was constructed and painted. During the winter the local power company extended its line from the town of Quilcene out to the vicinity of the station, and on March 14 the station electric-lighting system was connected with the company's line. A 3-horsepower electric motor was installed in the fish-food house for operating the food grinder.

At the beginning of the fiscal year there were 77,250 brook-trout fingerlings and 216,100 steelhead fry and fingerlings on hand. Some of these were distributed in October in Mount Rainier National Park waters; 2,000 of the brook trout were reserved for rearing to the adult stage; and the remaining stock of both species, after completing the Mount Rainier distribution, was liberated in local waters and delivered to the county game commissions of Jefferson and Clallam Counties, Wash. Collections of silver and steelhead salmon exceeded last year's collections of these species. The early run of chum salmon in the Big Quilcene and Little Quilcene Rivers was considerably below normal. Egg collections of the late-run chum salmon, obtained from the Little Quilcene River, Walcotts Slough, and Jackson Creek, exceeded those of last year. As a result of the season's collecting operations 9,147,000 eggs of the chum salmon, 1,193,000 of the silver salmon, and 608,000 of the steelhead salmon were obtained. In addition, 843,472 silver-salmon eggs were received from the Quinault (Wash.) station and 751,000 of the chinook salmon were shipped in from the Little White Salmon (Wash.) station, for the continuation of the efforts in progress for increasing the run of this species in the Big Quilcene and Docewallips Rivers; 200,000 black-spotted trout eggs were transferred from the Yellowstone Park, and 50,000 brook-trout eggs were derived from the State of Washington. All of these acquisitions were handled along with the local collections. The fry and fingerlings produced from the chum salmon, silver salmon, and chinook salmon eggs were liberated in local waters. The fingerlings resulting from the black-spotted trout eggs were distributed in Mount Rainier National Park. At the close of the year 44,724 brook-trout fingerlings and 389,750 steelhead fry and fingerlings remained on hand. The maximum feeding capacity of the station was utilized during the spring months.

Walcotts Slough (Wash.) substation.—The trap in Walcotts Slough is maintained and operated jointly by the Duckabush and Quilcene stations. The only species of salmon that enters and spawns in this slough is the late-run chum salmon. As the trap is on leased ground, no improvements are made other than those essential for the proper conduct of the work. Minor repairs were made to the trap in advance of the spawning season. The first fish appeared in the trap on November 20. Between November 24 and January 19 a total of 12,593,000 eggs were taken by the personnel of these two stations, of which number 7,108,000 were transferred to the Quilcene hatchery and 5,485,000 were shipped to Duckabush. All fry resulting from the collections were returned to their native waters on the completion of the yolk sac period.

Sultan (Wash.) substation.—The interior of the foreman's cottage was repainted, and other necessary minor repairs were made to buildings. During the late summer all fish-cultural equipment was painted and made ready for active service.

The 76,100 steelhead fry and fingerlings on hand when the year opened were reared until August 11 and then liberated in waters adjacent to the station. During the year 179,700 eggs of the chinook salmon, 879,500 of the silver salmon, and 321,600 of the steelhead were collected, the total exceeding that of the previous year by about 40 per cent. The fry and fingerlings resulting from the two first-named species were liberated in Elwell Creek, as were also the sac-absorbed fry resulting from a lot of 1,392,000 humpback salmon eggs developed at the station for the State of Washington. At the close of the year there were on hand 281,100 steelhead salmon fingerlings Nos. 1 and 1½, resulting from the egg collections of the species referred to above.

Lake Crescent (Wash.) State trout hatchery.—In 1927, when the work of attempting to establish a run of sockeye salmon into Lake Crescent through the Lyre River from Puget Sound was undertaken, the fingerlings resulting from approximately one million eggs of that species developed in the Lake Crescent hatchery were liberated in the lake, and yearly plants on the same scale have been introduced since that time. In the expectation that adult salmon resulting from the initial year's plant would return to the river in 1930, a close watch was maintained throughout the summer but no migration whatever could be discovered. After due consideration it was decided to continue the experiment through another year and to conduct at the same time a thorough investigation with the view of bringing to light any possible migration from the lake. Accordingly, a consignment of 1,004,800 eyed eggs from the Quinault (Wash.) station was developed in the Lake Crescent hatchery and on June 29 the 995,023 No. 1½ fingerlings resulting therefrom were planted in the lake. On May 4 an employee was assigned to make close observations in the lake and river and to ascertain if there would be a migration out of the lake of the young fish liberated therein in June, 1930. A migration was noted between May 11 and June 15; but it was also discovered that many of the young fish composing it were killed or injured in the river, apparently in passing through the numerous log jams and rock slides encountered. Again, a close watch was maintained to note if any adult sockeye salmon entered the river, but there appeared to be no evidence of such a return.

QUINAULT (WASH.) STATION

[Marcus S. Meyer, Superintendent]

During the fall spawning season, extending from October 22 to the end of December, 20,000,000 sockeye salmon eggs were taken and laid down for incubation in the hatchery, together with 2,700,000 silver salmon and 140,000 chinook salmon eggs. On reaching the eyed stage 5,361,984 eggs of this stock were forwarded to other stations of the bureau and to State hatcheries in Oregon and Washington. At the close of the fiscal year approximately 1,400,000 fingerling salmon were being reared for later distribution, the remainder of the production having been disposed of earlier in the season to make room for the growing stock. Besides caring for the eggs and fry derived from contiguous waters, the station's facilities were utilized for incubating nearly a half-million steelhead and black-spotted trout eggs for the Grays Harbor County game commission. After rearing to fingerlings the fry resulting from these eggs, they were turned over to employees of the game organization and distributed in county streams. With the object of increasing the station's rearing facilities, the construction of a self-cleaning elliptical long concrete rearing pond 20 by 80 feet in dimensions was undertaken and partially completed. It is the intention to utilize waste water from the six concrete rearing ponds now in use for the operation of the new pond. A concrete settling tank with necessary connections for 18-inch wood stave pipe was constructed and will be installed in advance of the coming spawning season.

CLACKAMAS (OREG.) STATION AND SUBSTATIONS

[Philo B. Hawley, Superintendent]

With the Clackamas station as headquarters, fish-cultural activities were conducted during the fiscal year 1931 at eight points in the States of Oregon, Washington, and Idaho. Six of these stations were maintained throughout the year, while two were utilized simply as egg-collecting units.

The aggregate egg collections of the group amounted to 51,398,000 or 28,898,000 in excess of last year's collections. Of this total 47,985,000 were from chinook salmon; the remainder were from silver, chum, and steelhead salmon and rainbow trout.

The station received the cooperation of the fish and game commissions of Oregon, such cooperation including financial assistance as well as aid in effecting transfers of fish and eggs and prevention of salmon poaching.

Clackamas (Oreg.) station.—Repeated failures of anticipated runs of fall chinook salmon to appear in the Clackamas River have justified the practice of making no attempt to intercept the small number of ascending fish. For the purpose of assisting to build up the run, the fingerlings resulting from 750,000 eggs transferred from the Little White Salmon station were liberated in the river. In addition to these, 1,003,000 spring chinook salmon eggs were received from the McKenzie River station of the Oregon Fish Commission. Chinook eggs numbering 2,025,000, collected at the Upper Clackamas station, were incubated at Clackamas, and the resulting fish in the fingerling stage were liberated in the Upper Clackamas River and its tributaries. Shipments of brook and rainbow trout and of silver and chum salmon were handled, and various applications for trout were filled. In cooperation with the Oregon Game Commission a fishery exhibit was displayed at the Pacific International Livestock Exposition.

Upper Clackamas (Oreg.) substation.—Only egg-collecting operations were undertaken in this field. Eggs of the fall chinook salmon to the number of 2,025,000 were secured here, and all of them were transferred in the green state to the Clackamas station for incubation.

Little White Salmon (Wash.) substation.—The usual racks and traps were installed in the Little White Salmon River early in September. Egg collections of the chinook salmon were made between September 22 and October 12, and though the water stage in the river was exceptionally low, the season's collection amounted to 24,880,000 eggs, or more than two and one-half times the number obtained in the previous year. With the view of intercepting any chum salmon in the river, the main head rack was maintained until late in November, making possible a collection of 375,000 eggs of that species. Of the chinook eggs secured 12,794,000 were transferred to outside points. The remainder were incubated and the resulting fish were liberated in the fingerling stage in the Little White Salmon River. Eighteen tons of salmon flesh were preserved in the cold-storage plant. In addition to this food, a considerable amount of horse flesh and condemned canned salmon was utilized in connection with the rearing operations. A 2-foot continuous wood stave pipe to a length of 1,100 feet was installed for a main water-supply line. There still remain 1,700 feet of pipe to be installed, together with an 80-foot trestle across the Little White Salmon River. During June the efficiency of the station was increased by the establishment of electric power and lighting facilities.

Big White Salmon (Wash.) substation.—The usual preparations were made for taking spawn of the fall chinook salmon in the Big White Salmon River and Spring Creek. By virtue of frequent and heavy stocking, the latter egg source has been built up from a stream barren of salmon to a first-class egg-collecting point: and in 1931, 4,087,000 eggs were secured from it, in addition to 9,050,000 obtained from the river. Of the season's collection of 13,137,000 eggs 3,434,000 were transferred to outside points. The remainder were incubated and late in May 8,320,000 fingerling salmon were available for distribution. Of these, 1,620,000 were planted in the Big White Salmon. The remainder were deposited in the Columbia River. Eggs taken from the Big White Salmon River were, as usual, transferred in the green state to the hatchery, and with very good results.

A number of brook and rainbow trout were reared for the Klickitat County game commission, for filling applications submitted for the stocking of private ponds. Spawned-out salmon, frozen and held in the refrigerator at the Little White Salmon station, was used as fish food, being utilized with quantities of horse meat, horse liver, beef spleen, and sheep liver. Patrolmen were again employed for the purpose of preventing illegal net and troll fishing, a practice which has increased greatly in recent years. As heretofore, one man was employed by the bureau and a man to act as his assistant was furnished by the fish commission of Oregon. Badges of authority for this work were granted the bureau by the State Fisheries Department of Washington.

Rogue River (Oreg.) substation.—The chinook salmon spawning season opened August 14 and continued to October 3, during which time 4,901,000 eggs were taken, as compared with 588,000 obtained last year. Eggs to the number of 780,000 were transferred to other points, and from the remainder 3,669,000 fingerling fish were produced and liberated in the Rogue River. In making the distribution 1,534,000 were transported below the Savage Rapids Dam in order to avert their possible loss later on in passing through the turbines pumping water to the main irrigation ditches at that point. Since the passage of the "White bill" efforts have been made to purchase a suitable site for a new fish-cultural station in the Rogue River field. It is expected that this new unit will be located adjoining the Butte Falls hatchery of the Oregon Game Commission. Efforts are also being made to purchase a site for the establishment of a permanent rack and trap in Big Butte Creek, for the purpose of making egg collections of the silver salmon, steelhead salmon, and cutthroat trout.

Applegate Creek (Oreg.) substation.—The run of silver salmon again proved disappointing and only 445,000 eggs were collected. To assist in maintaining the run 100,000 eggs of this species were transferred from the Quinault (Wash.) field. While the run of steelhead salmon in Applegate Creek was above normal only 1,741,000 eggs were secured. This was due to a changed method of operation. In past years the bureau has been subjected to criticism as a result of steelheads being lost in holding them in inclosures to ripen. To avert this, only fish in ripened condition, or nearly so, were retained. The green fish captured were returned to the stream with the expectation that they would return later. However, this proved disappointing, as the fish dropped downstream and spawned in waters well below the dam. It is believed that if the usual method of retaining green fish had been carried out the total take of eggs would have exceeded the collection of 5,720,000 made two years ago. Nearly a thousand green females were returned to the waters of Applegate Creek at one time. Eyed steelhead eggs to the number of 545,000 were transferred to other points. Due to the limited rearing facilities at this substation, the remaining eggs and fry were transferred to the Butte Falls hatchery of the Oregon Game Commission for incubation and rearing.

Salmon (Idaho) substation.—At the opening of the fiscal year there were on hand approximately 820,000 rainbow trout eggs and fry, the result of collections made at Williams Lake during the previous year. The collection of chinook salmon eggs commenced August 11 and extended to September 1, by which date 3,042,000 had been secured. To assist in perpetuating the run of this species, 2,000,000 eggs were transferred from the McKenzie River station of the Oregon Fish Commission. In the course of the year 4,972,000 chinook fingerlings were liberated in the Salmon, Pahsimeroi, and Lemhi Rivers. The State Fisheries Department of Idaho cooperated with the bureau during the year in the collection of rainbow trout eggs at Williams Lake. Eggs numbering 1,020,000 were secured, approximately 954,000 of which are on hand at the close of June.

BAIRD (CALIF.) STATION AND SUBSTATIONS

[W. K. HANCOCK, Superintendent]

Due to the small number of chinook salmon available for spawning operations, only 160,000 eggs were taken in the McCloud River. A change was made in the position of the upper rack during the year, and the presence of a group of large salmon promises a greater egg production in the coming season. It was very difficult to install this rack, as the water in some places where it crossed was 11 feet deep. Owing to the small number of eggs taken at Baird, arrangements were made for the transfer of 2,000,000 eggs from the Battle Creek substation and 1,000,000 from the Mill Creek auxiliary. The young fish produced were fed beef liver and salted salmon and were planted as advanced fry and Nos. 1 to 3 fingerlings in the McCloud and Sacramento Rivers. The winter and spring of 1931 were the driest in years, and the consequent low water stage in the McCloud River made it necessary to pump water into the hatchery and ponds up to the time the fish were released.

Two new rearing ponds were constructed in the course of the year. The mechanical equipment was overhauled and repaired, and necessary repairs and improvements were made to buildings.

Battle Creek (Calif.) substation.—Racks were installed early in the fall and the season's spawning operations began October 23. A large run of chinook salmon had congregated below the racks; and on November 26, after 11,130,000 eggs had been taken, the racks were opened and the considerable number of unused spawners remaining in the creek were released to spawn naturally. On attaining the eyed stage 2,000,000 eggs were transferred to the Baird station. The young fish resulting from the remainder were reared to as large a size as the facilities would permit and then liberated as fingerlings Nos. 1½ to 3 in Battle Creek. In the course of the season, 1,200 pounds of salmon flesh were salted for use as fish food.

One fairly large pond was built. Twenty old troughs were replaced by new ones and 200 trough covers for replacement were made. Driveways were improved; the hatchery, garage, mess house, foreman's cottage, and laundry shed were repaired; and a refrigerator was built in the mess kitchen.

Mill Creek (Calif.) substation.—Racks were installed in Mill Creek in August and active spawning operations with the chinook salmon extended from October 30 to December 2. On the latter date seining was discontinued, the racks were removed, and a large number of unspawned salmon held below them were allowed to proceed upstream. After reaching the eyed stage, 1,000,000 of the total season's collection of 5,137,000 eggs were transferred to Baird station. The remainder were hatched and the resulting fish liberated in Mill Creek as fry and small fingerlings.

The Mill Creek substation is located on a stream whose waters are diverted for irrigation during a large part of the year. In accordance with a previous promise of the irrigation company, water was turned into the creek on October 15, two weeks earlier than last year, with the result that a much larger number of salmon than usual were available for spawning operations. As the company takes the water again at the end of March, all fish on hand at the substation must be liberated prior to that time.

The hatchery foundation and floor were temporarily patched and miscellaneous repairs were made to other station buildings. Eight hundred pounds of salmon were salted for fish food.

FISHES OF THE GREAT LAKES

As usual, varying weather conditions affected greatly the collection of the eggs of lake fishes. Taken in general, very little difference is noticeable between the collections of 1931 and 1930. There was no successful egg take of cisco eggs at Duluth nor of pike perch eggs at Northville, and large increases were evident in the collection of lake trout and whitefish eggs at Charlevoix where the capacity of the hatchery was reached. The Put-in-Bay station realized large gains in collecting pike perch and whitefish eggs, as did the Cape Vincent station with cisco and whitefish spawn. In pond fish work the Cape Vincent station is credited with the largest production of smallmouth black bass of any station in the Northeast.

DULUTH (MINN.) STATION

[WARD A. COOK, Superintendent]

Operating under more favorable weather conditions than were experienced during the spawning season last year, the personnel of the Duluth station collected 20,500,000 lake trout eggs. Of these, 740,000 were shipped in the eyed stage to applicants in Maine, New York, Wyoming, Colorado, and Utah. The remainder were incubated and most of the resulting fry and fingerling fish were planted on the spawning grounds of the species in the Michigan waters of Lake Superior. The few otherwise utilized were given to applicants for the stocking of inland waters, among them being the Minnesota Fish and Game Department, which desired the fish for the planting of inland lakes in northern Minnesota. Lake trout egg collections began October 1, approximately two weeks later than the corresponding date last year. The first field occupied was the Portage Lake Ship Canal; but by October 13 the run of spawning trout had reached a point where it was deemed desirable to start fishing at Manitou Island, Huron Island, and Portage Entry, Mich., and by October 21 all available field stations were engaged in the work.

Through the efforts of commercial fishermen around the Isle Royale (Mich.) field 9,300,000 whitefish eggs were secured and incubated, and the 6,450,000 resulting fry were returned for liberation in the waters from which the eggs were derived. The high mortality experienced in the development of the eggs is believed to have been due to the adverse conditions under which they were collected and shipped. Through an exchange of eggs between the bureau and other parties, 237,000 eyed brook trout eggs were secured. The losses sustained in the hatchery were slight and the 214,000 fingerlings produced from the consignment were distributed by messengers to applicants in Michigan and Minnesota. In the spring cooperative pike perch egg collections were conducted in the vicinity of Bemidji, Minn., by the bureau and the Minnesota Game and Fish Department. Unfavorable weather retarded the run of fish and curtailed the supply of eggs. As a result of the work the Duluth station secured 8,000,000 eggs. From this stock 7,500,000 fry were developed and distributed to applicants in Minnesota, Wisconsin, and Michigan.

NORTHVILLE (MICH.) STATION AND SUBSTATIONS

[FRANK L. SNIPES, Superintendent]

No brood stock of trout is maintained at the Northville station. Eggs of brook trout, rainbow trout, and landlocked salmon were received and hatched during the year, and the resulting fry were reared to the fingerling size before being liberated. A few brook and rainbow trout on hand at the opening of the year were distributed and a number of fingerlings of these species remained on hand at the close of June, 1931. With the view of developing an egg-collecting station near Highland, Mich., 600 adult rainbow trout were placed in a lake near that point. Five cooperative trout nurseries were supplied with fish. In advance of the spring spawning season the station brood stock of smallmouth black bass was transferred from the pond where it had been held during the winter to two brood ponds. At the close of the spawning season approximately 90,000 fry were collected from these inclosures and placed in three rearing ponds which had been stocked previously with adult golden shiners to serve as a source of food supply. A number of bass fingerlings produced during the spring of 1930 were distributed early in the fiscal year. Forty-eight goldfish were planted in one of the ponds as an experiment in the production of forage fish.

Charlevoix (Mich.) substation.—Lake trout, whitefish, brook trout, and steelhead salmon were handled during the year at this substation. Eggs of whitefish and lake trout, purchased from the commercial fishermen of the region, were incubated in the station hatchery and the resulting fry were liberated on the spawning grounds in the vicinity of the collecting points. In January 150,000 brook-trout eggs were received from the bureau's Craig Brook (Me.) hatchery. The 146,250 fry resulting from this lot were distributed in near-by streams during April, the Charlevoix Chamber of Commerce assisting in the work. The 26,700 steelhead salmon carried over from the previous year's activities were planted in Lake Charlevoix in August by the Charlevoix Commercial Club. A lot of 34,200 two-inch fish of this species were reared from eggs received during the year and planted in the above-named lake in the spring of 1931.

Alpena (Mich.) substation.—Lake trout and whitefish eggs are collected in a number of fields near the Alpena station. Commercial fishermen strip the ripe fish, sell the eggs to the bureau, and ship the fish to market for food. On delivery to the station employees the eggs are transferred to the hatchery where the lake-trout eggs are laid down in troughs and the whitefish eggs are installed in jars for incubation. At the close of the hatching period the fry are distributed in the vicinity of the collecting fields.

The number of lake-trout and whitefish eggs collected during the year 1931 was disappointing. Chlorine in the water supply caused a heavy loss of whitefish eggs, though the lake-trout eggs were not greatly affected by it. During the spring 246,000 one-inch fingerlings of the latter species were placed in a nursery at Rogers City, Mich., and held until they had attained a length of 2 inches, at which time they were planted.

PUT IN BAY (OHIO) STATION

[DAVID DAVIES, Superintendent]

Early in November arrangements were made with the commercial fishermen for the collection of whitefish eggs. During the spawning season of this species, extending from November 11 to the end of the first week in December, 144,300,000 eggs were secured. This number represented a 100 per cent increase as compared with the take of the previous year and was the largest season's collection since 1923. The good results are attributable mainly to the unusually favorable weather prevailing throughout the spawning period. Collections of pike perch eggs were made between April 12 and May 4, the season's total amounting to 479,270,000, which was largely in excess of any year's total since 1911. The usual collections of eggs of the yellow perch and carp were omitted in 1931. During the early spring a number of adult smallmouth black bass were collected and forwarded to the Northville (Mich.) station for replenishing the brood stock at that point.

In the course of the year the paint was burned and scraped from the pilot house and boiler and engine rooms of the station steamer *Shearwater*, and the entire boat was afterwards given three coats of paint. A new trough was constructed and installed in battery No. 3.

CAPE VINCENT (N. Y.) STATION AND SUBSTATIONS

[J. P. SNYDER, Superintendent]

The four bass ponds partially built in the previous fiscal year were completed. These ponds were stocked in May with 500 adult smallmouth black bass. Near the end of June a total of 81,400 advanced fry had been removed and placed in public waters, and over 100,000 of the same size were awaiting shipment. Three concrete daphnia ponds were constructed.

Egg collections of the commercial fishes were confined to the New York waters of Lake Ontario, the work being done in cooperation with the New York Conservation Commission. No pike perch eggs were obtained and only small numbers of lake trout and yellow perch eggs were available. In all, 863,000 lake trout, 20,022,000 whitefish, 92,520,000 cisco, and 2,100,000 yellow perch eggs were secured. After rearing, the majority of the resulting fry were planted in Lake Ontario. The station's requirements for brook, Loch Leven, rainbow, and brown trout were met by the shipment of eyed eggs from outside sources. These were used for stocking the main hatchery, the substations, and the cooperative nurseries supervised from Cape Vincent station. The cooperative work is conducted in addition to that at the substations. Nurseries were located at Adams, Malone, Oneonta, and Arena, N. Y., and at Averill, Vt. The output from these projects consisted of 16,775 brook trout 6 to 10 inches long, 28,000 brook trout of smaller size, 28,000 lake trout, 5,200 Loch Leven trout, and 36,000 landlocked salmon, all fingerlings. When the year closed 173,100 fingerling and yearling trout were still on hand.

Watertown (N. Y.) cooperative substation.—A complete set of trough supports was put in. A total of 286,550 trout fingerlings were distributed, and as the year closed 672,816 fingerling trout were still on hand.

Barneveld (N. Y.) cooperative substation.—To increase the facilities a battery of outside rearing troughs was installed. Operations at this point are conducted in conjunction with the Utica Chapter No. 3 of the Izaak Walton League. The output reached a total of 201,400 brook and rainbow trout of various sizes, and 477,664 young trout remained on hand at the end of June.

Ithaca (N. Y.) substation.—During 1931, its first year of active production, the Ithaca substation distributed 169,285 brook trout and brown trout fingerlings and held a stock of 198,398 fingerling and yearling trout at the close of the year. The substation was used as a base for various feeding, rearing, and breeding experiments under the direction of Dr. G. C. Embody, of Cornell University.

Swanton (Vt.) substation.—As was the case last year, the take of pike perch eggs was disappointing, only 71,570,000 being secured. In connection with the work with this species 42,800,000 eggs of the yellow perch and 7,375,000 of the white sucker were taken. The sucker eggs were taken at the request of the Pennsylvania Fish Commission.

RESCUE OPERATIONS

The rescue of stranded fishes in isolated pools constitutes a considerable portion of the bureau's activities in the Mississippi River region. The usual summer lowering of the river level leaves many pools or ponds of water with neither inlet nor outlet. Many of these inclosures dry up or become stagnant. The fish in these former tributaries or backwashes are congregated in a small volume of water where they become easy victims of fish-eating birds, muskrats, snakes, etc., and may also be easily captured or killed by fishermen or poachers.

Every summer the bureau details a number of crews of experienced men to seine all fish out of such inclosures. The fish are then returned to the main river and its tributaries and are used in filling applications. During the fiscal year 1931 the rescue crews saved 182,534,861 stranded fishes, this number constituting an all-time record for the work.

LA CROSSE (WIS.) STATION AND SUBSTATIONS

[C. F. CULLER, in charge]

An addition of land for pond space was acquired at the La Crosse station during the year. The land has been cleared and an artesian well for water supply has been prepared. Three ponds near Lynxville, Wis., for bass propagation are now in use, and plans are being made for additional ponds for warm-water fishes at other points in this field. Success in the rearing of sunfish in the Wacouta pond near Red Wing, Minn., is reported. At this point rains caused the overflow of the pond during the bass season with a consequent loss of fish.

Rescue work extended from the middle of July to November 19. Eleven crews were engaged, operating in the bottom lands along the Mississippi River from above

Wabasha, Minn., to the headwaters of Lake Keokuk. A total of 156,697,141 fishes were rescued and of this number 155,720,719, or over 99 per cent, were returned to parental waters. The remainder, 976,422, were reserved for distribution.

In former years, in connection with fish rescue operations, the bureau has conducted mussel infection work to the extent of an output of billions of commercial larval mussels on the gills of suitable host fishes. However, polluted conditions in the Mississippi River have increased to such an extent that mussel life has been largely exterminated, making it impossible to continue the work to advantage.

Cooperative trout work in conjunction with the station's trout operations was continued, and during the year 1931 trout establishments to the number of 46 in Wisconsin and 11 in Minnesota were operated. The Wisconsin Conservation Commission assumed control of a number of the trout nurseries previously operated by the bureau that were located where the State could conduct the work to better advantage than the bureau. This change reduced the number of cooperative trout establishments operated by the station.

Cooperative bass ponds, perhaps because of the large areas required for them, have been more limited in number than the trout establishments. There is much interest in them, however, and the station has no trouble in supplying black bass fry for the ponds. The Minneapolis chapter of the Isaak Walton League is now conducting two ponds, each approximating 20 acres. In these ponds, however, bass are reared from brood stock. The Izaak Walton League at Mason City, Iowa, has also established a successful bass pond of 30 acres. A number of other bass ponds were operated commercially in Wisconsin and Minnesota. A pond of 28 acres was consigned to the rearing of pike perch at Mason City, Iowa. This cooperative work produced 25,000 6-inch fish, and is unique in the fact that it is the first large pond devoted to the rearing of pike perch to a fingerling size. Cooperative work with the Chamber of Commerce of Green Lake, Wis., resulted in a very successful collection and hatch of pickerel eggs. The cooperative establishments supervised from the La Crosse station are visited at least twice each season and advice and information regarding operations are made available to the cooperating parties at all times.

Collections of eggs of buffalofish and carp were made at field stations along the upper Mississippi River. The buffalofish work was undertaken in cooperation with the State of Arkansas. Eggs of both species were planted in favorable waters in the vicinity where taken. This work was hindered by low water and only mediocre results were obtained. Large numbers of gar were captured and destroyed by the seine crews. Before the end of the year 2 lakes and 1 slough on Goose Island, and about 12 miles below La Crosse, were prepared for bass rearing. Other locations for further work of this character are under consideration.

Bellevue (*Iowa*) *substation.*—This substation is operated as a plant for holding rescued fish prior to distribution. There were 34,000,000 carp and 29,928,000 buffalofish eggs collected in this point. These were fertilized and planted in the Mississippi River. The total collection of rescued fish in this field was 34,917,804.

Marquette (*Iowa*) *substation.*—Buffalofish eggs numbering 62,190,000 and 79,250,000 carp eggs were collected at this station. Rescue operations included the collection and planting of 68,167,173 fishes.

Lynxville (*Wis.*) *substation.*—Rescue operations at Lynxville covered the handling of 27,043,809 fishes. In addition this station was used for holding surplus trout from La Crosse during the spring months. Aquarium specimens and fishes for scientific investigations are collected and shipped from this point.

Homer (*Minn.*) *substation.*—Vessels for the entire Mississippi rescue field are overhauled and repaired at Homer. Other activities included the handling of 16,379,935 fishes in rescue operations and the use of a number of the station's ponds by the division of scientific inquiry in experimental fish-cultural work.

UPPER MISSISSIPPI WILD LIFE AND FISH REFUGE

The following report is submitted covering the biological investigations in the Upper Mississippi Wild Life and Fish Refuge:

The river stages attained by the Mississippi River following heavy rains in late May and early June, 1930, were of value in many respects, though loss of fry and adult bass to the river was experienced in several of the ponds. The rises showed, for example, the heights to which the screens across openings to the river should be built and low points in the banks of the sloughs from which invasion by the river might be expected. They showed which ponds could be most safely used for brood ponds, and which possessed the best shore contours for the latter purpose. During an invasion of the Richmond Island brood pond, negative rheotropism was exhibited by the bass fry in the pond. This habit of the small fry of swimming with the current showed it to be desirable to fill as many gaps between the sloughs and the river as possible to avoid currents out of them. Accordingly, during the summer and fall of 1930, as many of these gaps were filled as were found possible and practical.

Great difficulty was experienced during the early spring of 1930 in finding adult golden shiners in sufficiently large numbers to stock nursery ponds. This experience showed that dependence could not be placed on obtaining this supply in spring before the beginning of the spawning season. A small pond, fed by springs, was built in the fall of 1930 in Perrot State Park, near Trempealeau, Wis., and over 20,000 shiners were safely wintered in it. The early introduction of the shiners in the nursery ponds has shown its value, judging from the number of young shiners which may be seen in the ponds during the current season.

Of the 157,000 largemouth bass fry trapped from the Richmond Island brood pond and transferred to the sloughs during the spring of 1930, 27,000 were returned to the river as fingerlings in the fall. Many of the fry probably escaped to the river soon after they were introduced in the sloughs, as the river descended following the June rise.

MARINE SPECIES

Due to low market prices and a scarcity of fish, the collections of cod and pollock eggs were below those of the previous year. Of the five species handled, haddock and winter flounder showed sizeable increases. All the marine species are planted as eggs and fry. The individual accomplishment of special note in this field was the record collection of over 2,500,000,000 winter flounder eggs at the Boothbay Harbor (Me.) station.

BOOTHBAY HARBOR (ME.) STATION

[THOMAS H. DORR, Superintendent]

A new record for the collection of winter flounder eggs was made during the fiscal year 1931. Eggs of this species to the number of 2,716,449,000 were taken from 12,572 brood fish, which were captured in fyke nets in bays and coves within a radius of 12 miles of the station. Two boats of the bureau, the *Pelican* and launch *22*, were used to transport them to the station. Each boat had a crew of three men and was equipped with tanks to transport the fish alive to the station, where they were held until the eggs were collected. The fry produced—2,471,262,000—were liberated soon after hatching on spawning grounds in the vicinity of the station. The winter flounder work extended from March 3 to April 16. On April 7 the *Pelican* was assigned to the cod work and, with the assistance of launch *22*, covered most of the ground from Damascove Island to Seguin Island. Because of a shortage of spawn takers and lack of funds for chartering a third boat, the total cod egg collections fell far below last year's record, when three boats were available. Adverse weather conditions during the last two weeks of the season also served to cut down the total. Cod eggs to the number of 1,083,306,000 were collected and planted on the natural spawning grounds between April 7 and June 19. In conjunction with this work 156,570,000 haddock eggs were also collected and planted.

Construction work on the house for the engineer was completed. Numerous repairs were made to the fish culturist's residence and the hatchery building. A new egg stirrer, operated by electricity, was purchased and installed. A considerable amount of time was expended on the care of the aquarium. Work on the station boats was also necessary from time to time, and all the floating equipment was repaired and painted during the year.

GLOUCESTER (MASS.) STATION

[C. G. CORLISS, Superintendent]

Active fish-cultural operations opened November 1, with the collection of pollock eggs and resulted in a take of 388,130,000, which produced 241,683,000 fry. The great falling off in this work as compared with that of recent years was due largely to the fixing of a very low market price in November, with the result that most of the fishing boats abandoned the pollock work. The cod collections resulted in a total of 232,254,000 eggs. From eggs handled in the hatchery 77,715,000 fry were hatched and planted, and 133,482,000 green eggs were planted on the fishing grounds, the low density of the water in that area making it impracticable to transfer them to the hatchery. The comparatively small collection was brought about by an absence of cod on the spawning grounds all season. Haddock egg collections numbered 264,954,000—an increase over the work of recent years. From eggs developed in the hatchery 33,487,000 fry were produced and distributed, and 212,795,000 green haddock eggs were planted on the fishing grounds. The winter flounder work extended from March 6 to April 23. From a brood stock of 448 fish 276,562,000 eggs were secured and 252,625,000 fry hatched. The adult winter flounder were captured by means of 10 double-throated fyke nets set along the eastern shore of the outer harbor. In the offshore operations 45,757,000 cod eggs and 59,582,000 haddock eggs were collected and planted on the fishing grounds after being fertilized.

With the resumption of spring trap fishing at points within reach of the station's launches, attention was directed to obtaining eggs of other commercially important species for incubation and to securing fish and other animal life for display in the station aquarium. Daily trips were made to these traps. Mackerel eggs numbering 12,050,000 were taken and experimental work was tried with eggs of the scup. The scup eggs collected were turned over to the bureau's scientific division. Collections of live fish for the Shedd Memorial Aquarium in Chicago, Ill., and the Boston (Mass.) aquarium were made. In the station's aquarium 75 species of fish were displayed in inside tanks, while an exhibit of aquatic birds, sea turtles, seals, and sharks was maintained outside the building. The collection was shown only during the spring, summer, and early fall, and at the approach of winter all specimens were turned over to the Boston aquarium.

WOODS HOLE (MASS.) STATION

[G. R. Hoffses, Superintendent]

Because of the rise in water-shipping rates for small quantities of coal, a coal conveyer was purchased for handling coal delivered at the station by rail. A considerable saving in the coal bill was thus made possible. Another improvement was the purchase and installation of a new boiler to replace the old one, which had degenerated into an inefficient and unreliable piece of equipment. Other minor repairs and replacements were made.

In the cod spawning operations, brood fish were obtained as in the past from hand-line and trap fishermen. The cod were transferred to the station and held until ripe. An unusually high production of eggs per fish was realized, over 216,000,000 being secured from 1,173 brood fish. After spawning, all brood fish on hand were turned over to the division of scientific inquiry to be tagged and released. Fyke nets for winter flounder were set in Waquoit Bay during November, some six or eight weeks earlier than is customary. As an experiment, fish taken at that time were held to ripen, but because of the long holding period the eggs hardened in the ovaries and none could be obtained. Numbers of these winter flounder were taken, as usual, from early January to late March, and over a billion eggs were secured. Upward of 4,000 flounder were tagged by the division of scientific inquiry after the completion of spawning operations. No efforts were applied in offshore spawn-taking.

ANADROMOUS SPECIES, ATLANTIC COAST

Unsettled weather on the Potomac River and a scarcity of shad on the seining grounds in Albemarle Sound caused a comparatively poor collection of shad eggs. Work in collecting shad eggs and experiments in rearing shad in flooded rice fields were undertaken at Jacksonboro, S. C., for the second successive year, and experimental collections of shad eggs were made near Georgetown and Yemassee, S. C., in cooperation with the State. Collections of glut herring eggs at Edenton, N. C., and of striped bass eggs at Weldon, N. C., were of average proportions. Atlantic salmon work was carried on to the capacity of the Craig Brook (Me.) station after 4,000,000 eggs were received from the Canadian Government.

FORT HUMPHREYS (VA.) SUBSTATION

[CHARLES W. BURNHAM, Superintendent]

The collection of shad eggs extended from April 17 to May 18 and during this period 18,341,000 eggs were taken. From this stock 15,600,000 fry were hatched and planted at suitable points along the Potomac River on the shad spawning grounds. This work followed the collection of yellow perch adults, which lasted from February 25 to March 2. From these fish, which were held in wooden crates and allowed to spawn there, 86,840,000 eggs were secured. On the completion of spawning the adults were returned to their native waters and the eggs were incubated, the last of them hatching on April 28. Forty-six million, three hundred fifty thousand of the resulting fry were planted in the Potomac River and in the mouths of near-by tributary streams. The remainder of the 71,350,000 produced were delivered to the Virginia Commission of Game and Inland Fisheries for stocking other waters, principally tributaries of the Potomac. Cool weather was experienced during most of the yellow perch spawning period, greatly prolonging the season. The shad spawning period was also marked by unsettled weather, and though large catches of fish were made, comparatively few with ripe eggs could be obtained.

Last year's experiment of planting a lot of 1½-inch fingerling brook trout in a small spring-fed pond resulted in a production of 300 7-inch fingerling fish. These were distributed to applicants from the main station and the pond again restocked with another lot of 1½-inch trout.

A metal tank for holding water pumped from the river was installed on the hill above the station buildings and connected with an electric motor and pump arranged to operate automatically in keeping the tank filled with water. Valves and hose connections for fire protection were attached to the pipe system. A railway with carriers for transporting launches from the river to the boathouse was constructed during the year, and numerous other improvements were made.

EDENTON (N. C.) STATION AND SUBSTATION

[WILLIAM S. VINCENT, Superintendent]

In connection with the commercial seining operations, conducted as heretofore on the Capehart Beach at Avoca, N. C., a new seine one-third longer than that operated in the past was used. Collections of both shad and glut herring eggs were made by stripping the ripe fish captured in this work. Only 4,000 shad were caught and 750,000 eggs secured. The poor results were due to a lack of shad on the spawning grounds. There was a satisfactory take of glut herring eggs, however, though from a commercial standpoint the run of herring was almost ruinous. One hundred million eggs of this species were taken. These were stripped directly in starch water instead of applying the starch water later, in accordance with past practice, and because of this new method of overcoming adhesion of the eggs the percentage of hatch was increased from 30 to 50. In other words, half of the eggs secured produced fry, whereas the losses in incubation formerly approximated two-thirds of the collections. All shad and herring fry developed were liberated on or near the spawning grounds. The collection of yellow perch eggs amounted to only 1,500,000, and owing to adverse conditions during the hatching period, all of them were lost. The eggs are secured from adult yellow perch obtained from the commercial pound-net and fyke-net fishermen operating in the vicinity of Edenton. The fish are held in a pond until ripe, when they are spawned and released. Edenton station also made experimental collections of eggs of the white perch, and while only a negligible quantity was secured, possibilities for future expansion of the work were brought to light.

Weldon (N. C.) substation.—This substation is the only point where eggs of the striped bass (*Roccus lineatus*) are collected by the bureau. The State of North Carolina cooperates to the extent of paying half the cost of the work and assisting in the distribution of the fry. The operations during 1931 were directed by a fish culturist detailed from the Edenton station. As is the case with shad, the eggs are obtained from commercial fishermen. About 13,500,000 eggs were secured and incubated in the city water supply, producing 9,500,000 fry. These were liberated in the Tar, Neuse, and Roanoke Rivers.

ORANGEBURG (S. C.) SUBSTATIONS

[G. W. Hoofnagle, Superintendent]

Although no anadromous fishes are handled at the Orangeburg (S. C.) station, the bureau operated several substations in South Carolina which handle shad, with the Orangeburg station as headquarters.

Jacksonboro (S. C.) substation.—This auxiliary was in operation during the shad spawning season in March and April and a total of 4,865,000 shad eggs were collected, from which 2,884,000 fry were hatched and planted. About one-third of the number produced were planted in a flooded rice field 40 acres in area to be held until fall, when the pond will be drained and the shad liberated in the Edisto River. The production at this station was much larger than last year, and it is probable that it can be further augmented by entering into closer cooperation with the local shad fishermen. Trouble was experienced in securing male fish during the early part of the season but it was finally overcome by using a 4½-inch mesh net. During the latter part of the season the males are of very small size, and they were able to pass through the mesh of the net being used.

Georgetown (S. C.) substation.—The take of shad eggs in this field was very small, the season's collection amounting to only 208,000. From this stock 104,000 fry were developed and liberated in the Black River. From the experience gained during the season it is believed that the hatchery was located too near brackish water and that much better results might be obtained by conducting the operations 50 miles farther up the river.

Yemassee (S. C.) substation.—The initial year's work at this point included the collection and incubation of 394,000 shad eggs and the return of the resulting fry to the spawning grounds in the Combahee River. As at Jacksonboro, a shortage of male fish hindered the operations during the greater part of the season. There is promise of greater returns in this field if the fishermen can be brought to realize that the work being done is for their direct benefit.

CRAIG BROOK (ME.) STATION

[George N. Montgomery, Superintendent]

In the course of the year the bureau secured by exchange a total of 4,000,000 eyed Atlantic-salmon eggs from the Canadian Government. Due to the crowded conditions at the Craig Brook hatchery, 3,000,000 of these were reshipped to hatcheries operated by the State of Maine, with the view of having them reared to large fingerlings and yearling sizes and then deposited in waters connected with the Atlantic Ocean. Additional shipments included 25,000 to the Nashau (N. H.) station, 25,000 to the State of California, and 200,000 to the Grand Lake Stream substation. The fingerling fish resulting from the 679,500 retained at Craig Brook hatchery were liberated in the Penobscot River, the Maine Fisheries Department cooperating in the distribution. During 1931 the largest run of Atlantic salmon in years entered the Penobscot River. Both gill-net and weir fishermen reported good catches, and hook and line fishermen at the Bangor pool caught more than ever before to their recollection. The consensus is that the increased run is due to the bureau's activities in the propagation of this species. It is very probable that the practice followed within the past few years of raising fish to fingerling sizes before releasing them is largely responsible for the increased results. No other explanation appears plausible.

FISHES OF MINOR INTERIOR WATERS

The propagation of game fishes is mainly confined to inclosed waters. Variations in the supply of fish in these waters are so noticeable that it is comparatively easy to trace the causes of increase or decrease. This condition makes apparent to the angling public the results of fish-cultural methods, thereby enhancing the value of such work.

It is the policy of all conservation organizations throughout the United States that the public waters shall be kept as well stocked as possible with game fishes because of the value of these fish in the recreational life of the people. There are few sections of the country where some stocking is not necessary, although many lakes and streams are largely self-maintaining. The increasing importance of this type of recreation and the opening of new and better roads to the waters makes necessary the expansion of game fish cultural facilities. The work has also a monetary value, visible in the income from licenses, expenditures for guides, boats, bait, tackle, lodging, transportation, and the various other items which go to make up the cost of a fishing trip. These costs are so indefinite, however, that no specific sum can be ascribed as a valuation of the enterprise.

ROCKY MOUNTAIN TROUT STATIONS

The abundance of wild fish available as a source of egg supply makes possible the major part of the activities at the Rocky Mountain stations and substations. The waters in this region are exceptionally well suited to the raising of all species of trout. The eggs secured are used primarily to meet local requirements and the surplus, which is transferred, augments inadequate egg collections in other fields. A large part of the bureau's work in this region consists in the production of fish for stocking waters in the national parks and forests.

BOZEMAN (MONT.) STATION AND SUBSTATIONS

[W. T. THOMPSON, Superintendent]

Despite the handicap of low water due to drought conditions, Bozeman station and its auxiliaries experienced another record year. Collections of eggs totaled 23,480,000; and the distribution of eggs, fry, and fingerling fish amounted to 22,223,078. The distribution of fingerlings, yearlings, and adults amounted to 9,201,378 compared with 7,570,830 for the fiscal year 1930.

Bozeman (Mont.) station.—This station produced fingerling trout sufficient for 20 car lots by railroad distribution car in addition to a considerable number of fish distributed locally by truck and messenger. Aside from a small take of 40,300 brook-trout eggs, the station acquired its stock of eggs by transfer. Brook, Loch Leven, black-spotted, golden, and rainbow trout were included in the output. Success attended the rearing of Loch Leven fingerlings. Feeding experiments were suspended during the year because of drought conditions. Cooperation with the Montana Fish and Game Commission was maintained as formerly, the State delivering four truck loads of the bureau's fish to Yellowstone Park and assisting in the transfer of adult black-spotted trout and grayling to Bozeman. The California Division of Fish and Game, the Nevada Fish and Game Commission, the Forest Service, and other agencies also cooperated in the work. Reports of spawning golden trout in the Gallatin Forest arouse hope that the bureau may soon be able to collect its own stock of eggs from these fish.

Meadow Creek (Mont.) substation.—This substation exceeded its own records of 1929 in the collection of both Loch Leven and rainbow trout eggs. Its 1931 collections comprised 18,905,800 eggs of the Loch Leven trout, 42,000 of the black-spotted, 4,404,800 rainbow, and 131,400 brook trout eggs. The majority of the Loch Leven and rainbow trout eggs were shipped to other stations, including Bozeman, in the eyed stage. In exchange for some of these eggs, the Montana Fish and Game Department turned over to the bureau 1,945,500 eggs of the black-spotted trout. Shipments of Loch Leven trout eggs from Meadow Creek included 500,000 to the State of Arizona; 800,000 to Seattle, Wash., for distribution to the bureau's stations in that region; 3,709,500 to the State of Montana; and 8,311,800 to the Bozeman station. Of the rainbow trout eggs, 2,654,400 were shipped to Bozeman and 407,000 were transferred to the Glacier Park substation. All the brook trout eggs taken were sent to Bozeman. At the end of the year 1,128,900 of the black-spotted trout eggs received from the State of Montana were still unhatched; the remainder of the consignment had been planted in Madison Valley waters in the form of small fingerlings.

Glacier Park (Mont.) substation.—In preparation for the 1931 season minor changes were made in the arrangement of the water-supply pipes and troughs, and the electric lighting system was changed from the direct current supplied by the Glacier Park Hotel Co. plant to the alternating current supplied by the commercial plant operated from Browning.

During the season 559,200 black-spotted trout and 225,000 rainbow trout were distributed as fingerlings by the National Park Service, after being reared at the Glacier Park station. These trout were on hand as eggs at the beginning of the fiscal year and were distributed during August and September before the hatchery closed for the winter. Hatchery operations were resumed in March, with the receipt of 582,000 eggs of the rainbow trout and 994,320 of the black-spotted trout. The eggs of the latter species were received from the Montana Fish and Game Department. The fingerlings resulting from this stock will be distributed during the fiscal year 1932, at which time the Glacier Park field will be under the direct supervision of the District Supervisor at Salt Lake City, Utah.

Miles City (*Mont.*) *substation.*—Lake Garberson was drawn down in early September and its output of fish distributed. The distributions included 191,180 smallmouth blackbass, 44,475 crappie, 76,700 bluegill sunfish, and 4,500 catfish, the total output being considerably in excess of that in 1930. At the close of the harvest the lake was allowed to fill and 5,224 fish were planted to serve as a brood stock during the succeeding year. This lake is operated in conjunction with the State of Montana. Dry weather has lowered its water level since the last harvest and a reduced output in 1932 is anticipated.

During the past year construction work has created a new lake alongside Lake Garberson. Some difficulties were experienced in the operation of this inclosure, known as Lake Keough. Largemough black bass were introduced therein as an experimental brood stock. Two 20-pail shipments of daphnia and fresh-water shrimp and a 20-pail shipment of golden shiners were received from the bureau's Crawford (Nebr.) station. The daphnia and shrimp were divided between the two lakes, while the shiners were allotted to Lake Keough, Lake Garberson already having been stocked with these fish. Additional work on the water supply and excavation of the lake bottoms, to facilitate drainage and harvesting, is contemplated for the near future.

LEADVILLE (COLO.) STATION AND SUBSTATIONS

[C. H. Van Atta, Superintendent]

Station improvements during the year included the construction of a new drainage ditch 2,300 feet long from the hatchery sewer to Lake Creek. For a length of 3 miles the old wagon road above the hatchery was reconstructed and placed in condition for trucks, after which saw logs were hauled for lumber for use at Leadville and for the new Crystal Lake project. From the logs 25,315 board feet of lumber was sawed, planed, and sized at the Leadville mill. The station's production of 3,940,100 brook, black-spotted, Loch Leven, and rainbow trout was distributed by means of the bureau's distribution car No. 7, assisted by the station force. During the year the station acquired by transfer 545,100 black-spotted trout eggs from the Creede and Yellowstone Park substations, and from the collections made at Pyramid Lake, Nev.; 199,200 Loch Leven trout eggs and 100,000 rainbow trout eggs from the Bozeman (Mont.) station; 54,300 lake trout eggs from the Charlevoix (Mich.) station; and 180,000 rainbow trout eggs from Eagle Nest Lake, in New Mexico. In addition, the usual egg collections in private lakes under a percentage agreement were made, permitting of a total collection of 5,269,000 brook and Loch Leven trout eggs. Brook trout eggs numbering 660,000 were transferred to other stations.

The rainbow trout egg collecting field at Eagle Nest Lake, N. Mex., produced 1,964,000 eggs of which 400,000 were turned over to the State of New Mexico, and 180,000 were shipped to the Leadville station. The remainder were hatched at Eagle Nest Lake, and the resulting fry were used in stocking Eagle Nest Lake and other waters in New Mexico.

Crystal Lake, on a privately owned property 4½ miles from the Leadville station, is being developed as a rearing pond substation. A 9-acre lake is being cleaned out and a cement outlet provided.

Creede (*Colo.*) *substation.*—The fiscal year 1931 was the second year of operation of the Creede substation. Collections of eggs were made possible by percentage agreements with parties owning reservoirs containing brood stock. Brook, rainbow, and black-spotted trout eggs numbering 1,835,000 were secured by this means, and 2,487,700 additional eggs were received by transfer. Of the total, 1,289,800 were shipped to other stations and allotted to the owners of the reservoirs from which collections were made. Fry hatched numbered 786,000. Distributions of brook, rainbow, Loch Leven and black-spotted trout totaled 1,326,800; and numbers of eggs, fry, and fingerlings were on hand at the end of the year.

YELLOWSTONE NATIONAL PARK (WYO.) SUBSTATION

[C. F. CULLER and FRED J. FOSTER, in charge]

The spawning season at the Yellowstone Park station in the summer of 1930 was a normal one in every respect. The crew reached Yellowstone Lake on May 13, and the station was closed for the season on September 13. Work began under the direction of District Supervisor C. F. Culler. On July 1, with the creation of the new Rocky Mountain region, the operations were transferred to the supervision of District Supervisor Fred J. Foster. The new hatchery building, which had been practically completed in the fall of 1929, was placed in commission in June, 1930, and operated for the first time. The vast improvement over former conditions was greatly appreciated by the station crew and also by the thousands of visitors, who viewed the splendid new aquarium and the operations in the hatching room from the raised balcony especially constructed for the purpose.

During the year one concrete rearing pool, 60 feet long and 8 feet wide, was constructed east of the new lake hatchery. It was connected with Hotel Creek by 1,200 feet of 6-inch wood pipe, which was also tapped into the hatchery line for emergency use. A building 80 feet long by 22 feet wide was constructed for the housing of a garage, a workshop, storage room, and food preparation room. The three rearing pools west of the hatchery were completely reconstructed, and a quantity of débris and fallen timber was removed from around them. At Mammoth Springs a log frame building, 12 feet by 20 feet in dimensions, was constructed. It contains two rooms, one for food preparation and the other for the storage of equipment. Five hundred feet of 12-inch wood pipe was installed for bringing hot water to the rearing pools.

One of the rangers of the National Park Service was detailed to cooperate in the distribution of fish in the interest of park fishing conditions and rendered excellent service by distributing from the Mammoth rearing pools a large number of 1½-inch to 4-inch fingerling black-spotted, Loch Leven, and rainbow trout. The superintendent of Yellowstone Park considers that the distribution accomplished during the season was the best that has ever been made in park waters.

Increased demands for fish have been made from the surrounding region, particularly the Jackson Hole country; and increased distributions were made, especially to the national forests in this area.

The collection of black-spotted trout eggs for the season numbered 15,389,000 or approximately 750,000 more than in the preceding year. Of this total 1,654,000 were collected from fish caught in trap nets, this constituting a new departure in securing fish in Yellowstone Lake. Judging from the experience gained, it is believed that this form of collecting fish will be of much importance in future years. As the fish do not seem to ascend the stream in some years as well as in others, the fishing of nets at various points in the lake may tend to offset years of short runs in the creeks.

The Mammoth rearing pools were operated from July 10 to the close of 1930, principally to determine the advisability of operating these pools through the winter. It was found, however, that warm water from the Mammoth Hot Springs was of sufficient quantity to operate not more than three pools and that it was impracticable to mix the warm springs water with the summer supply from Gardiner River without lowering the temperature to a point where the growth of the fish would be greatly retarded. During the fall and spring when ice was forming or breaking up in Gardiner River great difficulty was experienced in maintaining an even temperature with the mixed river and spring water, as the cold water supply would be checked by the ice formation, thus creating a balance in favor of the warm water and sometimes causing temperature fluctuations of 10 degrees within a half hour. Owing to these conditions it is not considered advisable to again operate the Mammoth rearing pools in the winter months.

SARATOGA (WYO.) STATION

[S. M. AINSWORTH, Superintendent]

During the year a third electric wire was run from the electric plant in the town of Saratoga to the station, to permit the installation of an electric motor to furnish power for preparing fish food. The use of an additional hatching room has greatly facilitated the handling of fry and fingerlings. All the hatching troughs were kept well filled with fingerlings, though fish were planted as rapidly as they could be handled for a period of more than six weeks. Collections of brook trout eggs were disappointing as to number but additional shipments received from other stations of the bureau should permit of a record output of this species during the latter part of 1931. The brood Loch Leven trout produced sufficient eggs to meet the needs of the station and allow for the shipment of 100,000 eggs to outside points. The station received more applications for that species during the year than ever before.

In 1928 a few black-spotted trout eggs received from Pyramid Lake, Nev., were placed in one of the brood stock ponds and during the spring of 1931 the two hundred and twenty-five 3-year-old fish held therein yielded 125,000 eggs of good quality. Rainbow trout egg collections were better than had been anticipated in advance of the spawning season, taking into consideration the low stage of water both in Pathfinder Reservoir and the streams emptying into it. Some of these streams did not carry sufficient water to enable the larger fish to ascend as far as the traps, though the traps are located as near to backwater in the reservoir as is practicable during a normal season. A cloud-burst in the upper part of Lost Creek so flooded the hatchery there that more than 3 inches of mud was washed into the troughs, making it imperative to immediately plant in parent waters all eggs and fry on hand in an effort to save as many of them as possible. An additional shipment of fry was diverted from the main station to the Lost Creek field in order to replace the stock lost. A temporary battery of troughs was set up at a small spring near the Lost Creek hatchery to ascertain if it would be possible with a better supply of water to save many more eggs from the later collections. The experiment proved quite satisfactory. Two hundred thousand eggs of the black-spotted trout were received from Pyramid Lake, Nev. A number of fingerlings resulting from them had been planted before the year closed and 159,000 were still on hand in the hatchery.

SPEARFISH (S. DAK.) STATION AND SUBSTATION

[D. C. Booth, Superintendent]

The cottages occupied by the station superintendent and fish culturist were shingled during the year and a new gas-heating system was installed for heating the hatchery building and residences. The intake from the creek, which supplies water to the larger hatchery ponds, was improved to provide a more adequate and safe supply. The activities at this station are concerned with the propagation of the brook, rainbow, and Loch Leven trout. Eggs of these fishes numbering 1,410,475 were taken from the station brood stock, and of the 610,900 rainbow trout eggs secured over 400,000 were transferred to other stations and exchanged for brook trout eggs. The year's distributions of fish numbered 1,919,240, of which 574,790 were large fingerling trout that had been carried over from the hatch of the previous year. The brood stock of Loch Leven trout, consisting of 2,171 fish measuring 12 to 25 inches in length, was released in suitable waters. This action was taken because Loch Leven trout eggs are obtainable from the Montana field, where they are collected from wild stock at a much lower cost than is involved in the maintenance of a brood stock of this species. A considerable amount of favorable comment and newspaper publicity has been ascribed to the work of the bureau in this region in maintaining sport fishing.

Crawford (*Nebr.*) *substation.*—Work connected with the completion of this substation was continued throughout the year. Two cement ponds were constructed at the north end of the hatchery, the flagpole base was made, the pole set in position, and walks were laid. An auxiliary water supply was piped to the hatchery for tempering the main water supply, which is too warm in summer to maintain trout and too cold in winter for the incubation of healthy fry. The first floor and basement of the apprentice fish culturist's cottage was completed. A nursery pond was constructed near the source of the auxiliary water supply at a distance of several miles from the hatchery.

No brood stock of fish has as yet been established at the Crawford substation and all stock furnished during the year was in the form of eyed eggs shipped in from outside sources, the total shipments comprising 646,015 brook, rainbow, and Loch Leven trout eggs. The losses sustained in their development were small. Some of the resulting fish were distributed as small fingerlings, but the majority were held over to be planted as large-size fingerlings during the fiscal year 1932. A lot of 48,275 trout 4 to 7 inches in length, carried over from the hatch of the previous year, were distributed. The pond fish distributed were obtained from Minatare and McDowell Lakes, and black bass were transferred here from the Miles City (Mont.) substation. A total of 92,825 fingerling and adult pond fishes, consisting of catfish, bream, black bass, and yellow perch, formed part of the station's output for the year.

SPRINGVILLE (UTAH) STATION

[CLAUDIUS WALLICH, Superintendent]

The collection of eggs from rainbow trout brood stock, numbering 2,951,000, exceeded that of the preceding year; and it would have been much larger had not a cloudburst caused the escape of about 900 spawning fish. As approximately 3,000 first-year spawners will be available from growing stock next fall, however, the station will doubtless be in a position to produce a continuously increasing output of this species. The year's distribution of fingerling fish amounted to 1,910,800 as compared with a production of 1,619,000 last year. The distribution was effected by making a considerable number of trips with the State tank truck and 74 messenger trips, the total mileage involved amounting to 30,200. Only about one-fifth of the fish shipped were as small as No. 2½ fingerlings; the remainder consisted of No. 3 fingerlings and larger.

So far as the resistance of the Indians is concerned the work of collecting black-spotted trout eggs in the Pyramid Lake (Nev.) field is now on a fairly sound basis. During the spring of 1931 4,877,000 of these eggs were secured.

Work in the Fish Lake (Utah) field was conducted as usual in cooperation with the State. From this source the bureau derived 1,773,000 brook trout eggs and 733,000 rainbow trout eggs. The State, as per agreement, received a larger share. A total of 2,912,000 eyed eggs were shipped from the Springville station during the year. Of this number 990,000 were black-spotted trout eggs, taken in Pyramid Lake; 927,000 were rainbow and brook trout eggs, from the Fish Lake field; and 995,000 were rainbow trout eggs, from the station brood stock.

NEW ENGLAND TROUT STATIONS

Outstanding accomplishments at these stations included the collection of more than 4,000,000 brook trout eggs at the Craig Brook (Me.) station and of more than 7,000,000 brook trout eggs at the York Pond (N. H.) station. The York Pond station is being enlarged to provide adequate fish-hatching apparatus and ponds.

BERKSHIRE (MASS.) STATION

[E. P. THOMPSON, Acting Superintendent]

Drought conditions cut down the water supply, making it necessary to dig for an additional supply. Four ditches were cut into the steep bank back of the springhouse. These ditches were about 50 feet long and varied in depth from 3 feet at the entrance to 15 feet at the back end. Approximately 100 gallons a minute were made available by these excavations.

The station brood stock of brook trout yielded 750,000 eggs, of which 308,000 were shipped to the Nashua (N. H.) station and 2,000 to the Bruce Museum at Greenwich, Conn. There were 334,715 brook trout fingerlings, yearlings, and adults, 4,325 yearling catfish and 366 smallmouth black bass fingerlings and adults distributed. There were 35,042 brook trout fingerlings and yearlings on hand at the end of the season. Of the brook trout distributed, 50,800 were furnished to 10 cooperative nurseries.

A 20-foot space was added to the east end of the garage, making room for two automobiles on the ground floor, and increasing the storage room above. One-half of the Pond A dam, about 60 feet, was rebuilt. A small dam was constructed at the upper end of the lower hatchery, making a small pond between the two hatcheries, and the side walls and top of pond 3 were faced with 8 inches of concrete. Numerous minor repairs to buildings and equipment were made. On account of frequent rains it was necessary to haul many loads of gravel to keep the roads in condition.

CRAIG BROOK (ME.) STATION AND SUBSTATION

[GEORGE N. MONTGOMERY, Superintendent]

The record production of 4,085,600 brook trout eggs secured from the station brood stock during the year necessitated the transfer of over a million eyed eggs to other stations. A large number of the fish resulting from the retained eggs were distributed as Nos. 1 and 2 fingerlings, and 268,800 fingerlings were on hand at the end of the year. The 118,400 fingerling brook trout and 73,966 landlocked salmon fingerlings carried over from the stock of the previous year were delivered to applicants. Additional landlocked salmon eggs numbering 700,000 were received from the bureau's Grand Lake Stream auxiliary and from the State of Maine. Transfers of eyed eggs were made to the Grand Lake Stream substation, to the York Pond (N. H.) station and to the Bozeman (Mont.) station. Fingerlings resulting from the retained stock to the number of 295,400 were liberated and 132,000 were on hand at the close of the year.

During the year the capacity of the hatchery was increased by the building of additional ponds. A new piping system for the hatchery troughs was installed, and numerous repairs were made to the station equipment.

Grand Lake Stream (Me.) substation.—Of the stock on hand at the opening of the year 255,355 landlocked salmon, brook trout, and Atlantic salmon from 1½ to 3 inches long were distributed. The Atlantic salmon were distributed in conjunction with distribution work conducted by the State of Maine. The fall collection of landlocked salmon eggs numbered 1,241,715. Of these 668,840 were shipped in the eyed stage to other stations. This substation received from the main station at Craig Brook 75,000 landlocked salmon eggs, 200,000 brook trout eggs, and 200,000 Atlantic salmon eggs. In the latter part of the year 365,000 fingerling fish were distributed and at the end of June, 1931, 413,990 fingerlings were being carried in the station ponds. The only construction work accomplished consisted in minor repairs and improvements, including the painting of the hatchery and other buildings.

ST. JOHNSBURY (VT.) STATION AND SUBSTATION

[A. H. DINSMORE, Superintendent]

Except for the resumption of activities with the smallmouth black bass, the fry of which were collected from open waters and transferred to the station ponds for rearing, the work of the St. Johnsbury station was conducted along the same lines as in past years. Fry to the number of 1,424,529 were produced from a total of 1,509,062 eggs, of which 1,327,349 were brook trout. The remainder were Loch Leven trout and landlocked salmon and steelhead salmon in nearly equal numbers. Owing to the unsuitable nature of the station's water supply for the production of fingerlings, the majority of the fish hatched were distributed as fry, though a few fingerlings of the three last-named species were on hand at the close of the year.

York Pond (N. H.) substation.—The main purpose of the work in this field is the production of brook trout eggs from carefully selected brood stock held under semiwild conditions. During the fall of 1930 a total of 7,277,933 eggs of that species were collected, this number representing an increase of approximately 50 per cent over the collection of the preceding year. As a by-product the station produced 330,750 unfed fry, 288,400 fingerlings, 72 yearlings, and 1,240 adult brook trout. Some of these were supplied to applicants and the remainder were planted in public waters in northern New England. An attempt to handle landlocked salmon resulted in almost complete failure. Apparently the very favorable natural conditions existing at the station for brook trout propagation are in some way inimical to the salmon. This theory seems to accord with the fact that brook trout and landlocked salmon are rarely found together in a wild environment.

The availability of a special appropriation of $25,000 permitted the continuance of development work at the station during the year. The funds were utilized in the purchase of a gasoline excavator, in improving the station well, canal, and pond systems, and in the construction of permanent buildings to take the place of the temporary buildings used since the inauguration of the bureau's fish cultural work in this field. Cement blocks, made at the station, are being used in the construction work, together with lumber manufactured from logs cut on the reservation.

PITTSFORD (VT.) STATION

[Dr. H. S. DAVIS, Director; R. F. LORD, in charge]

During the first part of the fiscal year five ponds for large fingerlings and older trout were constructed. Concrete was used to replace wood planking in the sides of a 60-foot double raceway, and a concrete wall was constructed at the lower end of the ice pond.

Feeding experiments resulted in a fine growth and remarkable coloration of trout fed on dried salmon eggs in combination with liver. Experiments emphasized the fact that certain dried products can be used in combination with fresh meats with as good or better results than can be obtained when straight fresh meats are used. The lower prices of these dried products allows considerable saving in food costs. The establishment of superior strains of trout through selective breeding was continued throughout the year. Selection is based on growth, health, and number and fertility of the eggs produced. There were on hand at the end of the fiscal year 150 different lots of trout, separate records being maintained for each lot. Most gratifying results are being obtained in this work. Distribution at this station was confined to the disposal of surplus fish. Observations are being made of the results of the planting of 6,900 yearling Montana grayling. These fish were planted in a tributary of the Middlebury River in August, 1930; and during May, 1931, they were reported as being healthy and possessed of good growth.

NASHUA (N. H.) STATION

[JAMES D. DEROCHER, Superintendent]

In addition to regular operations this station has supplied with fish and supervised 10 cooperative stations maintained by fish and game clubs. These clubs exhibited a keen interest in the work. They were supplied with 95,000 brook trout 2 inches in length during the previous fiscal year, from which 39,300 fingerlings of a length of 5 inches resulted. These were distributed in October and November of 1930. Last season was a very dry one but as there were occasional rains during the season of 1931, the prospects are for a better output of fish than that of last year. Regular fish-cultural operations included the rearing and distribution of brook trout, Atlantic salmon, landlocked salmon, rainbow trout, smallmouth black bass, and catfish. Brook trout eggs numbering 184,235, 26,435 smallmouth black bass fry and fingerlings, and 950 catfish were produced from the station brood stock. Transfers from other points increased greatly the number of eggs handled. Over 400,000 trout of all sizes and 27,385 fingerling smallmouth black bass and catfish were distributed. A total of 316,625 trout and salmon was on hand at the end of the year.

COMBINATION TROUT AND POND FISH STATIONS

All of these stations realized satisfactory outputs with the exception of that at Erwin, Tenn. Drought greatly affected the water supply at several of the stations and varying weather throughout the pond fish spawning season cut down production. At the Manchester (Iowa) and Tishomingo (Okla.) stations additional ponds for the production of bass and sunfish were constructed.

ERWIN (TENN.) STATION

[A. G. KEESECKER, Superintendent]

Eggs numbering 788,150 were collected from the rainbow trout brood stock. Two lots of brook trout eggs were received from the Craig Brook (Me.) station. The trout produced were distributed as fingerlings to applicants. Only 9,000 rainbow trout fingerlings were carried into the 1932 fiscal year. Work with largemouth black bass allowed a distribution of 35,775 fingerling bass. Distributions of other pond fishes were: Rock bass, 11,610; sunfish, 26,340; all fingerlings. Largemouth black bass numbering approximately 10,000, 15,000 rock bass and 12,000 sunfish were on hand at the end of the year. Cold and rainy weather affected the spawning of the pond fishes and was largely responsible for the low output. The usual maintenance repairs and improvements were carried on and a new garage and storage room was planned during the year and partially constructed.

MANCHESTER (IOWA) STATION

[G. H. GILL, Superintendent]

The fish-cultural activities at Manchester consisted mainly of the propagation of rainbow and brook trout. Although the rearing of the pond fishes is not attempted on a large scale, four earth ponds are reserved for the rearing of smallmouth black bass and rock bass. During the season rainbow trout eggs totaling 862,900 were collected. Consignments of 436,000 eyed eggs were shipped to other stations or supplied to applicants. The remaining stock was reserved to be hatched and reared for later distribution. Brook trout eggs to the number of 923,000 were received by transfer. The year's total trout distributions amounted to 1,276,200, and at the end of June 92,000 rainbow trout and 152,400 brook trout fingerlings were still on hand.

The prevalence of furunculosis among the brood stock of rainbow trout caused a heavy mortality. One thousand adult rainbows were killed and buried in lime, on instructions of the district supervisor, and all ponds, drains, and equipment were disinfected with slacked lime or potassium permanganate.

Improvements consisted in enlarging Pond Z, hauling 125 cubic yards of clay for the bottom and sides of the large bass pond, erecting framework over the rearing ponds and covering it with poultry netting, constructing 100 feet of cement flume near the brood ponds, and removing 65 feet of wooden drain at the rearing ponds and replacing it with an 8-inch terra-cotta pipe. Cement holding platforms were also installed at the head of canal ponds Nos. 2 and 3.

NEOSHO (MO.) STATION AND SUBSTATIONS

[W. H. THOMAS, Superintendent]

This station and its auxiliaries experienced a very satisfactory year notwithstanding the fact that the extended drought materially affected the water supply of both the Bourbon and Langdon substations. The total number of eggs, fry, and fingerlings handled amounted to 3,277,255, all from station stock.

Neosho (Mo.) station.—The physical condition of the station is satisfactory with the exception of a few needed minor repairs to pond walls and banks, which were damaged by winter frost. There has been no epidemic disease either in the brood stock or fingerling fish, and the rainbow trout spawn was of a slightly better quality than in the previous year. Experiments in the feeding of rainbow trout during the year again demonstrated that better results are obtainable at this station by including a portion of sheep liver in the diet. During the winter a shipment of eyed Loch Leven trout eggs was received from the Bozeman (Mont.) station. The eggs were in good condition when received and they developed normally, but the young fish resulting from them would not partake readily of the several foods offered. For this reason their growth has not been equal to that of rainbow trout of the same age. Continued experiments at this station in pond culture have resulted satisfactorily as compared with former years. The output of pond fishes during the past two years has been greater than in the best four years in the previous history of the work in this field.

Bourbon (Mo.) substation.—This station is operated on a cooperative basis with the owners of the property, and the interest of the bureau is in the production of rainbow trout spawn. All fish reared belong to the owners, for use as future brood stock or for such other disposition as they may desire. Owing to the heavy loss of yearling fish as a result of the flood in August, 1929, fewer 2-year-old spawners than heretofore were available. For this reason the egg collections were smaller than those of the previous year. The prevailing drought during the summer of 1930 also cut down the spring water supply to the extent that the flow was only about 40 per cent of normal.

Langdon (Kans.) substation.—As in past years the collections of pond fishes consisted of black bass, crappie, bluegill sunfish, and other pond species, with black bass forming the larger portion of the total. As was the case in other fields, the drought had an adverse effect upon the work, and while fairly satisfactory collections were obtained, they were not as large as they would have been under normal weather conditions. Some of the ponds dried up for the first time since they were built 25 years ago, causing the total loss of all fish held therein.

Tishomingo (Okla.) substation.—A low head dam and race for conducting the water supply to the ponds was built. The dam is of concrete, across Pennington Creek, and the present length of the race is 5,500 feet. In the construction of the race approximately 7,000 yards of rock and earth were moved, and 4 tons of dynamite were used to assist in its removal. Eight ponds covering an area of 14 acres and six minnow ponds were built during the year, necessitating the removal of some 25,000 yards of earth. A collection of brood bass was obtained prior to the spawning season, but the occurrence of frosts all through Oklahoma late in April killed practically all the eggs deposited by the fish.

WHITE SULPHUR SPRINGS (W. VA.) STATION

[EDWARD M. HAYNES, Superintendent]

Though hampered to some extent by a protracted period of drought, the year's activities in this field yielded fairly successful results. Trout eggs numbering 2,335,000 were collected, of which 1,805,000 were rainbow trout and the remainder Loch Leven trout. Cooperative relations were continued with the Cheat Club, of Durbin, W. Va., and the agreement heretofore effective with the West Virginia Game and Fish Commission was still in force. Under this arrangement the State purchased 1,200,000 eyed brook trout eggs for the bureau's and its own requirements and received in return 362,600 fingerling brook trout and 25,000 each of the Loch Leven and rainbow trout. In all 2,663,000 brook trout eggs were handled, of which number 1,663,000 were derived through the medium of exchange. The year's distributions of this species consisted of 1,117,720 large-sized fingerlings. The station brood stock of Loch Leven trout produced 530,000 eggs and 200,000 additional were received from the Bozeman (Mont.) station. The year's distribution of fingerling fish of this species amounted to 343,806. Of the rainbow trout eggs collected, 627,300 were shipped on assignment when eyed, and from the remainder 310,133 large fingerlings were incubated and reared. There was a substantial increase in the output of the warm-water pond fishes, the unfavorable effects of the drought not being so pronounced as in some years. The output of these species included 77,206 black bass, 6,600 rock bass, and 17,800 bream. At the close of the year there were on hand 150,000 brook trout, 55,000 rainbow trout, and 5,000 Loch Leven trout, all fingerlings. No new construction of any kind was undertaken during the year; but all buildings, grounds, and equipment received prompt attention when in need of repairs.

WYTHEVILLE (VA.) STATION

[C. B. GRATER and S. A. SCOTT, Superintendents]

The output for the year consisted of 331,360 rainbow trout, 245,775 brook trout, 24,425 largemouth black bass, 900 smallmouth black bass, 33,500 bluegill sunfish, 8,500 rock bass, and 500 catfish. At the close of the year 95,000 rainbow and 244,400 brook trout were on hand. With the view of producing larger size trout for distribution, a parcel of land known as the Pannell Spring was leased and a number of nursery ponds were constructed. This land is about 3 miles from the Wytheville station, and when completed it will have a capacity for rearing three hundred thousand 4-inch trout. During the year the Virginia Department of Game and Inland Fisheries leased to the bureau the State hatchery at Newcastle, Va., and it is now being operated under the supervision of this station. Considerable work was done toward painting and improving the hatchery and residence interiors. The roof of the settling tank was repaired by replacing the rotten sills and putting on a slate covered roofing. The entire place with the exception of a distance of about 40 rods was inclosed with a new fence. Three cooperative nurseries operating under the supervision of this station were furnished 20,000 rainbow trout and 51,000 brook trout.

POND FISH STATIONS

Stations restricting their production to pond fishes are naturally confined to sections of the United States where waters of sufficiently high temperature are available. The feeding habits of these fish necessitate the production of natural foods, which practice requires the utilization of large pond areas. Plant and insect growth are encouraged as much as possible, and the fish are introduced into the ponds to forage for themselves. All of these stations were at least slightly affected by adverse weather conditions through the spawning season and by diminished flow of water supplies due to drought.

COLD SPRING (GA.) STATION AND SUBSTATIONS

[CHARLES A. BULLOCK and JOHN BLOSZ, Superintendents]

Construction operations during the year were confined to the repair of existing buildings. The pond system was improved considerably by filling in the deeper portions of several ponds and grading the bottoms of several others. During the fall and winter the ponds were drawn down and treated with a heavy application of lime. At intervals of two weeks beginning in April and continuing throughout June the ponds were fertilized with a mixture of equal parts of acid phosphate and pulverized sheep manure. A few brood bass purchased during the winter were lost before the opening of the spawning season. Notwithstanding the loss of this new stock the output of fish was greater than in any previous year in the history of the station. The total number distributed amounted to 965,240. Of this total 658,455 were largemouth black bass; the remainder were bream and catfish.

Harris Ponds (*Ga.*) *substation.*—In addition to fish-cultural work, activities at this point consisted in the care of ponds and grounds, including minor repairs to dams and outlets. The bream produced at this substation are transferred to the main station for distribution. The year's output of fingerling bream in this field amounted to approximately 75,000.

Valdosta (*Ga.*) *substation.*—Development work at this substation was continued. A third drainage well, with a 16-inch casing, was drilled, and work on a fourth well of the same diameter was started. A 35-foot by 40-foot holding shed was constructed, and equipment consisting of eight 500-gallon capacity stock tanks was installed. A 65-foot cypress flag pole was erected in front of the office building.

Grassy Lake, the basin of which comprises an area of approximately 300 acres, refilled to only one-tenth of its original area. This condition was caused by drought, the lake having no artificial water supply. As but little of the shallow vegetation producing area of the lake was under water, the fish were thus confined to the deeper runways where there was little or no aquatic growth. In the early part of the winter the lake was drained and the fish distributed. With the exception of a very small number all fish distributed were classified as adults. The total production consisted of 5,730 largemouth black bass, 18,215 bream, and 10,000 warmouth bass. In addition to the fish distributed approximately 4 tons of suckers and catfish were carried away to be used as food by local parties. Ten alligators were killed during the year, besides hundreds of turtles and snakes.

EDENTON (N. C.) STATION

[WILLIAM S. VINCENT, Superintendent]

Roach, gambusia, and fresh-water shrimp were collected from near-by waters as a source of food supply for the young fish in the various ponds. Daphnia were also collected for use while fry were still abundant. An appreciable number of bass, sunfish, and crappie adults were secured from outside sources for the improvement of the brood stock. The production of bass fry and fingerlings was nearly equal to that of last year, though pond and weather conditions were far less satisfactory. The auto trucks were again used to advantage, and at a considerable saving in time and expense, in distributing fish to points not readily reached by railroad. The production of sunfish was only about one-third of normal. The cultivation of the ponds conducted during the past several years seems to be producing the desired result of an increased growth of aquatic vegetation.

LOUISVILLE (KY.) STATION

[HERMAN O. HESEN, Superintendent]

During the year, water supply lines and drains were installed. The barn and outbuildings were razed, the residence and hatchery buildings were painted, and the appearance and condition of the station and its equipment were maintained and otherwise improved. More fish were propagated at the station during the year than in the previous year. Of a total of 656,888 fish produced and distributed 612,000 were smallmouth black bass fry and 3,730 were fingerlings; 27,000 were largemouth black bass fry and 5,810 were fingerlings; 8,223 were rock bass, and 125 were fingerling bream. One pond was constructed by enlarging Pond B and using the excess earth to form an embankment across a swale at the lower end of the station. This additional pond space is partially accountable for the material increase effected in the output of fish. The lack of pond acreage compels the distribution of bass in the fry stage. The few fingerlings distributed were fish that had escaped as fry and remained in the breeding ponds with the brood stock. Considerable saving was effected in the distribution work by having many applicants call at the station for their fish, by the use of the station automobile for principal messenger trips, and by taking advantage of reduced rates offered by the railroads over week-ends and holidays.

MAMMOTH SPRING (ARK.) STATION

[DELL BROWN, Superintendent]

All buildings were given two coats of paint outside, the office and workshop were refinished inside, and a flue was built in the office room. The two upper ponds were consolidated and 6 to 8 inches of gravel was removed from the bottom of the pond and replaced with clay, to stop seepage. The smallmouth black bass season was a failure, as the eggs failed to hatch. However, the largemouth black bass did exceptionally well, and while only 169,000 fingerlings of this species were shipped, they were all of good size and probably they had a greater stocking value than those in any previous year's output. The output of rock bass and bream was also satisfactory.

In addition to the station fish-cultural work 800,000 pond fishes, one-half of which were bass, were produced at four cooperative units in whose work the station actively participated. The most important of these establishments was the Arkansas State hatchery at Lonoke, Ark.

ORANGEBURG (S. C.) STATION

[S. A. SCOTT and G. W. HOOFNAGLE, Superintendents]

A new building 31½ by 33 feet in dimensions, containing an office, two bedrooms, a bath, and storage space in the basement, was completed in the course of the year, after which the old office building and shop were dismantled. The ponds were cleaned, several were sanded, and several were fertilized with 50 per cent sheep manure and 50 per cent superphosphate, approximately 600 pounds to the acre being used. The year's output of warm-water pond fishes was somewhat smaller than that of last year, but all fish were distributed in the fingerling stage. Two rice fields below Jacksonboro were converted into experimental rearing ponds for bass. Gates were installed at the inlet from the river and the fields flooded on high tide. Closing automatically on the falling tide, the gates retain in the ponds the water thus acquired. In the larger pond, approximately 40 acres in area, 55,225 fingerling bass were planted, while the smaller 15-acre pond was stocked with 20,000 of the same size. When the ponds were inspected on June 16 the water in the larger one was so muddy that nothing could be seen, but a goodly number of bass were observed around the edges of the other inclosure. The ponds will be drained in the fall and any production of young bass found therein will be distributed to applicants. The output of bream was abnormally low, doubtless because of a diseased condition among the brood stock, a parasite being found imbedded in the ovaries of the fish. These fishes were discarded and a new brood stock acquired for next year's work. The station also produced an output of 15,420 warmouth bass, 23,300 crappie, and 1,220 catfish. At the close of the year work on the enlargement of the Orangeburg station had started.

SAN MARCOS (TEX.) STATION AND SUBSTATIONS

[O. N. BALDWIN and C. B. GRATER, Superintendents]

The establishment of a new brood stock of black bass at the main station in advance of the spawning season was followed by a fairly successful production of that species. The calamitous effects upon early spawning by the usual occurrence of sudden and severe periods of temperature decline were practically nullified during 1931 by increasing the depth of water over the bass nests and providing for a heavy flow of water during such times. It has been demonstrated, however, that the slough pond can not be thus regulated and heavy losses of eggs and fry were again experienced following sudden temperature declines. During the spring young fish numbering 259,225 fry and 82,545 fingerlings were collected from the spawning ponds with seines and dip nets and distributed to applicants. Several of the small ponds in the basin system were utilized for rearing fry to the fingerling stage. The old stock of bream, consisting of a mixed lot of various species of the sunfishes, was discarded and a new stock of blue-gill bream was obtained from the Valdosta (Ga.) substation. The Rio Grande perch, recently introduced from waters near the Mexican border, have become adapted to their new environment and reproduced very satisfactorily during the year. As usual the supply of crappie was obtained from stock tanks on ranches in proximity to the station. The number obtained was increased materially, as compared with past years, by the acquisition of additional tanks.

Lake Worth (*Tex.*) *substation.*—An addition was made to the rear of the cottage, and a shed was constructed on adjacent ground. A well was driven and cased to supply water for domestic use. A deep-well pump connected to a gasoline engine, a steel tower, and a water storage tank were constructed. The fall distribution of the warm-water species was increased over that of last year, although the facilities for holding the fish were somewhat inadequate. Two small earth ponds were constructed for holding fish for the spring distribution. Severe temperature declines during March and April resulted in the loss of early deposited eggs and as a consequence the spring distribution of bass was limited to 26,500 fingerlings and 4,000 fry. At various times during the year rescue operations were conducted in Trinity River for salvaging crappie and catfish from flood waters, and some of these fish were utilized in filling applications. In the course of the year the old brook stock of bluegill sunfish was discarded and a new brood stock was obtained from the Tupelo (Miss.) station.

New Braunfels (*Tex.*) *substation.*—The year's output from this substation comprised 64,500 fry and 14,800 fingerling fish. The work was done under greatly improved spawning conditions due to the establishment of a new brood stock of black bass in advance of the spring spawning season.

TUPELO (MISS.) STATION AND SUBSTATION

[CHARLES R. WIANT, Superintendent]

No construction work was in progress, and only such minor repairs were made during the year as were necessary for the proper maintenance of the buildings. Two of the ponds were enlarged by the removal of earth from the edges. The removed soil was utilized for reinforcing the outside levees. The fencing on the crown of the levees was removed and reset at a distance of 3 feet outside the levees.

Fish-cultural activites were extended by the establishment of two cooperative bass nurseries in the western part of the State and by the leasing of a 10-acre lake near Tuscaloosa, Ala. After cleaning these ponds they were stocked during the spring with small bass. The fall distribution work was handled by Fisheries car No. 8, and after filling all applications a carload of fingerling bream was taken on board for delivery to Virginia applicants. Surplus bream numbering 85,000 were carried through the winter and used in the spring for stocking Medina Lake, Tex., and for shipment in connection with the spring bass distribution in Mississippi. Practically the same number of bass were produced as in the previous year, but the percentage of fingerling fish distributed in 1931 amounted to 42.2 per cent of the whole as against 26.5 last year. The total number of bass and bream distributed during the year amounted to 715,520, exclusive of the bass used in stocking a station nursery pond.

Aliceville (*Ala.*) *substation.*—The combined output of bass and bream from the five small ponds operated in this field amounted to 72,585. Practically the entire output of fish was delivered to applicants who called at the ponds to receive them.

LAKELAND (MD.) PONDS

[E. K. BURNHAM, acting in charge]

During the fall of 1930 all ponds were drained and fish not needed for brood stock were distributed. All brood stock was held through the winter in pond No. 2. In the spring the ponds were refilled and restocked, a supply of minnows as forage fish being added. The total distribution for the year was 60,700, including fry and fingerling crappie, sunfish, and largemouth black bass.

FAIRPORT (IOWA) STATION

[A. H. WIEBE, acting director]

At this station propagation methods to be employed in the production of pond fishes are established. Experiments are carried on with a view toward increased production with a minimum of labor and cost. A special appropriation allowed the expansion of facilities during the year. Six new dirt ponds varying from 0.68 to 2.58 acres in area and four concrete ponds 8 feet wide and 50 feet long were constructed. The installation of two new electric pumps for furnishing river water for the ponds was also effected. Electric pumps were attached to two wells on the reservation with the view of providing for a water supply to the residence, the laboratory, and some of the ponds. All buildings were painted.

Four crews using the station as headquarters captured and distributed 25,857,200 fish in fish rescue work.

CENTRAL STATION AND AQUARIUM, WASHINGTON, D. C.

[CHARLES W. BURNHAM, Superintendent]

Throughout the year the usual exhibit of live fish and aquatic animals was maintained. Exhibits included 34 different species, and individual fish numbered 3,523, excluding the eggs of chinook salmon, cisco, rainbow trout, and pike perch, which were displayed during the incubation and fry periods.

There were 3,043,000 fry produced from the eggs incubated. These and 40,220 other fish, which were produced chiefly at Lakeland, Md., and Fort Humphreys, Va., were distributed from the Central Station to applicants and for the stocking of public waters in near-by States.

Part 2.—DISTRIBUTION OF FISH AND FISH EGGS

[E. C. FEARNOW, Superintendent of Distribution]

While the output of fish (7,121,805,700) was slightly below that of the previous year, the distribution was much heavier due to the large size of the fish distributed in inland waters. The output of fingerling fish in 1931 exceeded the 1930 output by approximately 70,000,000.

The four distribution cars made 142 trips delivering 34,038 fish, an average of 230 pails per trip. In making this distribution the cars traveled 120,699 paid and 8,143 free miles. Detached car messengers made 534 trips delivering 17,392 pails of fish, on an average of 32 pails per trip. This does not include 679 pails of lake trout planted in Lake Superior by car messengers. The station messengers made a total of 886 trips delivering 20,684 pails of fish, or an average of 24 pails per trip. This does not include the distribution of commercial species from the New England, Great Lakes, or Pacific coast stations. The bureau messengers traveled during the year 304,784 paid and 104,665 free miles.

The following table summarizes the distribution of fish and fish eggs during the fiscal year to applicants in the United States and its territories. It also shows the plants of fish made by the bureau in public waters of the country in connection with the propagation of commercial fishes, and the salvaging of fish from temporarily flooded lands.

Summary, by species, of the distribution of fish, fiscal year 1931

State and species	Number
Alabama:	
Catfish	200
Rainbow trout	2,320
Crappie	480
Largemouth black bass	259,025
Sunfish	203,230
Alaska:	
Chum salmon	85,000
Sockeye salmon	49,035,000
Humpback salmon	1,406,434
Steelhead salmon	142,826
Arizona:	
Catfish	1,295
Rainbow trout	428,000
Black-spotted trout	275,600
Loch Leven trout	700,000
Brook trout	25,000
Crappie	7,900
Largemouth black bass	27,000
Sunfish	5,305
Yellow perch	3,600
Arkansas:	
Catfish	450
Buffalofish	11,004,000
Rainbow trout	10,100
Crappie	5,335
Largemouth black bass	187,875
Rock bass	9,220
Sunfish	22,140
California:	
Chinook salmon	15,832,000
Atlantic salmon	25,000
Rainbow trout	100,000
Colorado:	
Catfish	2,550
Chinook salmon	450,000
Rainbow trout	1,493,880
Black-spotted trout	448,300
Loch Leven trout	573,600
Lake trout	236,000
Brook trout	2,663,500
Crappie	5,400
Largemouth black bass	12,325
Sunfish	4,250
Steelhead salmon	200,000
Connecticut:	
Loch Leven trout	200,000
Brook trout	7,490
Crappie	400
Smallmouth black bass	1,225
Pike perch	2,500,000
Yellow perch	150
Delaware:	
Largemouth black bass	620
Sunfish	70
Florida:	
Largemouth black bass	140
Smallmouth black bass	400
Rock bass	400
Sunfish	1,000
Georgia:	
Catfish	1,550
Rainbow trout	91,800
Brook trout	24,100
Crappie	4,955
Largemouth black bass	210,505
Sunfish	195,730
Idaho:	
Chinook salmon	972,000
Steelhead salmon	261,050
Landlocked salmon	6,800
Rainbow trout	755,250
Golden trout	2,600
Black-spotted trout	435,000
Illinois:	
Catfish	175
Silver salmon	225,792
Rainbow trout	10,000
Black-spotted trout	10,000
Crappie	1,700
Illinois—Continued.	
Largemouth black bass	13,550
Sunfish	1,015
Yellow perch	300
Indiana:	
Catfish	1,850
Rainbow trout	21,000
Brook trout	10,000
Crappie	6,700
Largemouth black bass	28,200
Smallmouth black bass	32,600
Sunfish	1,310
Yellow perch	1,025
Iowa:	
Catfish	67,673,000
Buffalofish	92,040,875
Carp	124,438,660
Rainbow trout	7,150
Brook trout	3,300
Pike and pickerel	337,749
Crappie	19,538,810
Largemouth black bass	198,914
Sunfish	7,722,260
Yellow perch	187,873
White bass	25,013
Fresh-water drum	11,239
Miscellaneous fishes	3,431,313
Kansas:	
Catfish	2,400
Rainbow trout	510
Crappie	5,850
Largemouth black bass	54,141
Sunfish	6,675
Kentucky:	
Catfish	1,650
Crappie	4,300
Largemouth black bass	26,915
Smallmouth black bass	557,150
Rock bass	7,900
Sunfish	350
Louisiana:	
Largemouth black bass	1,630
Sunfish	7,600
Maine:	
Atlantic salmon	3,878,600
Landlocked salmon	509,200
Lake trout	400,000
Brook trout	969,405
Crappie	400
Smallmouth black bass	7,550
Cod	1,073,573,000
Haddock	270,069,000
Winter flounder	2,471,262,000
Maryland:	
Catfish	500
Chinook salmon	8,000
Rainbow trout	115,100
Brook trout	124,400
Crappie	1,300
Largemouth black bass	10,700
Sunfish	830
Pike perch	600,000
Massachusetts:	
Catfish	5,746
Landlocked salmon	4,000
Rainbow trout	268,200
Loch Leven trout	100,000
Brook trout	136,675
Mackerel	8,580,000
Crappie	600
Smallmouth black bass	17,375
Yellow perch	150
Cod	441,992,000
Haddock	240,369,000
Pollock	240,219,000
Winter flounder	1,433,406,000
Michigan:	
Catfish	1,700
Whitefish	73,860,000
Steelhead salmon	184,850

Summary, by species, of the distribution of fish, fiscal year 1931—Continued

State and species	Number
Michigan—Continued.	
Rainbow trout	174, 700
Loch Leven trout	13, 500
Lake trout	23, 332, 000
Brook trout	2, 192, 400
Crappie	6, 600
Largemouth black bass	10, 030
Smallmouth black bass	33, 800
Sunfish	810
Pike perch	7, 002, 000
Yellow perch	4, 055
Minnesota:	
Catfish	2, 703, 465
Buffalofish [1]	49, 990
Carp [1]	1, 192, 700
Rainbow trout	73, 800
Loch Leven trout	43, 500
Lake trout	42, 000
Brook trout	148, 500
Pike and pickerel	107, 400
Crappie	6, 890, 825
Largemouth black bass	255, 355
Sunfish	595, 505
Pike perch	2, 900, 000
Yellow perch	935, 940
White bass	15, 085
Fresh-water drum	810
Miscellaneous fishes	16, 124, 950
Mississippi:	
Largemouth black bass	274, 665
Sunfish	258, 755
Missouri:	
Catfish	4, 865
Rainbow trout	313, 260
Loch Leven trout	6, 132
Crappie	15, 080
Largemouth black bass	26, 912
Rock bass	1, 550
Steelhead salmon	50, 000
Sunfish	6, 000
Yellow perch	175
Montana:	
Catfish	4, 500
Rainbow trout	2, 731, 540
Golden trout	46, 300
Black-spotted trout	3, 419, 460
Loch Leven trout	8, 412, 500
Brook trout	27, 900
Crappie	92, 472
Largemouth black bass	122, 525
Sunfish	51, 375
Yellow perch	100
Nebraska:	
Catfish	3, 800
Rainbow trout	49, 650
Loch Leven trout	134, 400
Brook trout	38, 725
Crappie	150
Largemouth black bass	1, 500
Sunfish	700
Yellow perch	2, 300
Nevada:	
Rainbow trout	428, 500
Brook trout	10, 000
Black-spotted trout	62, 500
Crappie	750
Largemouth black bass	16, 750
Sunfish	2, 500
Yellow perch	150
NewHampshire:	
Catfish	1, 650
Steelhead salmon	4, 000
Atlantic salmon	5, 000
Landlocked salmon	27, 000
Rainbow trout	10, 800
Loch Leven trout	13, 600
Brook trout	284, 700
Smallmouth black bass	3, 960
Pike perch	240, 000
New Jersey:	
Rainbow trout	1, 200
Brook trout	3, 000
Catfish	100
Crappie	1, 400
Largemouth black bass	7, 870
Sunfish	3, 690
Yellow perch	300, 000
New Mexico:	
Catfish	1, 800
Rainbow trout	175, 000
Black-spotted trout	50, 400
Loch Leven trout	1, 050, 000
Brook trout	106, 200
Crappie	2, 380
Largemouth black bass	8, 425
Sunfish	13, 100
New York:	
Catfish	2, 675
Whitefish	10, 275, 000
Cisco	63, 200, 000
Steelhead salmon	135, 000
Landlocked salmon	20, 000
Rainbow trout	82, 079
Black-spotted trout	10, 000
Loch Leven trout	77, 500
Lake trout	581, 150
Brook trout	599, 174
Crappie	290
Largemouth black bass	15, 650
Smallmouth black bass	91, 960
Sunfish	1, 150
Yellow perch	1, 700, 286
Winter flounder	23, 149, 000
North Carolina:	
Catfish	1, 800
Shad	650, 000
Glut herring	50, 000, 000
Rainbow trout	247, 700
Brook trout	86, 720
Crappie	11, 780
Largemouth black bass	155, 547
Warmouth bass	3, 625
Sunfish	22, 056
Striped bass	9, 500, 000
North Dakota:	
Largemouth black bass	350
Sunfish	75
Ohio:	
Catfish	550
Whitefish	73, 280, 000
Chinook salmon	1, 000
Crappie	970
Largemouth black bass	12, 070
Smallmouth black bass	140
Sunfish	500
Pike perch	133, 000, 000
Yellow perch	500
Oklahoma:	
Catfish	750
Rainbow trout	10, 245
Crappie	25, 900
Largemouth black bass	44, 225
Sunfish	26, 325
Yellow perch	748
Oregon:	
Chinook salmon	16, 143, 000
Sockeye salmon	1, 507, 200
Silver salmon	725, 350
Chum salmon	66, 000
Steelhead salmon	718, 850
Rainbow trout	20, 500
Loch Leven trout	200, 000
Brook trout	96, 300
Pennsylvania:	
Catfish	40, 725
Common sucker	1, 375, 000
Rainbow trout	391, 200
Loch Leven trout	215, 900

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[1] Rescued fishes planted in Mississippi River.

Summary, by species, of the distribution of fish, fiscal year 1931—Continued

State and species	Number	State and species	Number
Pennsylvania—Continued.		Vermont—Continued.	
Brook trout	1,023,030	Pike perch	24,080,000
Crappie	41,290	Yellow perch	35,400,300
Largemouth black bass	85,375	Largemouth black bass	450
Smallmouth black bass	1,000	Smallmouth black bass	500
Sunfish	5,555	Virginia:	
Pike perch	500,000	Catfish	1,500
Yellow perch	9,745	Rainbow trout	140,770
Rhode Island:		Loch Leven trout	4,800
Brook trout	500	Brook trout	155,205
Crappie	500	Largemouth black bass	204,145
South Carolina:		Smallmouth black bass	900
Catfish	1,495	Crappie	6,554
Rainbow trout	42,800	Sunfish	116,765
Brook trout	13,600	Yellow perch	71,704,725
Shad	3,240,000	Pike perch	500,000
Crappie	13,375	Shad	15,600,000
Largemouth black bass	183,345	Washington:	
Rock bass	2,100	Chinook salmon	31,083,100
Warmouth bass	11,350	Chum salmon	17,734,500
Sunfish	9,700	Silver salmon	20,369,400
South Dakota:		Sockeye salmon	7,091,800
Catfish	200	Humpback salmon	22,000,100
Rainbow trout	163,050	Steelhead salmon	1,561,000
Loch Leven trout	624,400	Rainbow trout	76,900
Brook trout	432,460	Black-spotted trout	2,728,664
Largemouth black bass	25,975	Brook trout	109,960
Yellow perch	600	West Virginia:	
Tennessee:		Catfish	4,100
Catfish	3,600	Rainbow trout	221,800
Rainbow trout	44,865	Loch Leven trout	25,000
Brook trout	38,720	Brook trout	441,625
Crappie	125	Largemouth black bass	34,055
Largemouth black bass	32,000	Smallmouth black bass	34,015
Rock bass	6,550	Rock bass	500
Sunfish	42,810	Sunfish	10,180
Texas:		Yellow perch	850
Catfish	3,410	Pike perch	1,400,000
Crappie	28,730	Wisconsin:	
Largemouth black bass	486,980	Catfish	12,980,412
Rock bass	5,950	Buffalofish	11,228,000
Warmouth bass	22,500	Carp	11,012,800
Rio Grande perch	47,665	Rainbow trout	364,550
Sunfish	67,305	Loch Leven trout	229,800
Utah:		Brook trout	1,480,350
Catfish	500	Pike and pickerel	3,182,450
Chinook salmon	984,000	Crappie	1,289,997
Landlocked salmon	25,000	Largemouth black bass	220,222
Rainbow trout	1,134,800	Sunfish	901,857
Black-spotted trout	423,000	Pike perch	1,413,000
Lake trout	100,000	Yellow perch	218,252
Loch Leven trout	596,500	White bass	6,780
Brook trout	113,500	Fresh-water drum	425
Crappie	750	Miscellaneous fishes	5,210,300
Largemouth black bass	4,050	Wyoming:	
Sunfish	2,075	Catfish	4,425
Yellow perch	1,720	Rainbow trout	2,079,105
Vermont:		Golden trout	1,700
Catfish	1,500	Black-spotted trout	7,560,250
Steelhead salmon	25,200	Loch Leven trout	2,038,103
Rainbow trout	16,800	Lake trout	250,000
Black-spotted trout	28,900	Brook trout	706,965
Loch Leven trout	5,000	Grayling	1,000,000
Lake trout	50,000	Largemouth black bass	9,450
Brook trout	482,782	Sunfish	9,000
Grayling	3,000	Yellow perch	1,040

METHOD OF DISTRIBUTION

In making distribution of fish, consideration is first given to the waters from which the fish or fish eggs were collected; after which, shipments are made to suitable public or private waters upon applications previously submitted. Blanks on which formal requests for fish may be made are furnished by the bureau. These blanks call for a complete description of the waters to be stocked, and from this information are determined the species of fish that is suitable and the number that can be apportioned to the water area in question.

The bureau finds it impracticable to investigate the condition of all streams to determine their suitability for particular species of fish, although such a study would be highly desirable, as it would afford a basis for intelligent assignments. Since this is not practicable at present and the bureau is required to rely on information furnished by applicants, it is decidedly important that such information be as accurate and complete as possible.

Applicants are notified immediately upon receipt of their requests concerning the species assigned and the approximate date of delivery, and are given full directions for receiving and caring for the fish. Before shipment is made a second notice is given, usually by telegram, stating the exact time of arrival of the fish at the railroad station. The fish are delivered at the station without expense to the applicants. In the event that it becomes necessary to delay shipment, the applicant is notified accordingly.

NEW TARIFF COVERING SHIPMENTS IN BAGGAGE CARS

For a number of years the bureau has been given the privilege of carrying in baggage cars, when accompanied by an attendant holding transportation covering his own passage, not to exceed twenty 10-gallon cans of live fish or 20 cans or crates of fish eggs, or 20 such containers combined, free without check with each attendant.

Within recent years the bureau has been using a special pail of approximately 5-gallon capacity which will safely transport as many fish as are ordinarily carried in one of the old 10-gallon cans. The pails weigh only 40 pounds each when filled with water and they can be stacked in a small space and one man can handle two of them with ease.

In the view of the above, the secretary of the Association of General Baggage Agents was written with the view of obtaining permission to carry 40 instead of 20 pails in a messenger shipment. The baggage standard rules committee recommended the following tariff governing the transportation of fish which has already been published by the New England, Trunk Line, and Central Passenger Associations:

> Less than carload lots only when shipped by Federal or State authorities and when accompanied by an attendant holding transportation covering his own passage.
>
> Not to exceed forty 5-gallon pails of live fish or twenty 10-gallon cans of live fish, or 20 cans or crates of fish eggs, or 20 such containers combined, will be carried free without check in regular baggage service with each attendant.
>
> Train baggagemen will allow attendants to enter baggage car in order to give shipments such attention as may be necessary while en route.
>
> Empty cans, crates, and pails will be returned free, if properly tagged, without being accompanied by attendants.

COOPERATION WITH THE UNITED STATES FOREST SERVICE

The problem of keeping the national forests well stocked with fish is becoming more acute every year, due to the increased number of anglers. The forests, while largely wildernesses, are easily accessible because of the thousands of miles of good roads and trails. Their wide distribution makes them natural centers of summer recreation. Everything possible is being done by the bureau in cooperation with the Forest Service to provide good fishing on these governmental reservations.

A report from the Acting Forester, under date of August 28, 1931, gives the total fish planted by regional foresters as follows:

Region	Locality	Number planted
1	Idaho, Montana, South Dakota, Washington	14,616,900
2	Colorado, Michigan, Minnesota, Nebraska, Oklahoma, South Dakota, Wyoming	7,841,000
3	Arizona and New Mexico	16,000
4	Arizona, Colorado, Idaho, Nevada, Utah, Wyoming	34,650,571
5	California and Nevada	4,633,675
6	Oregon and Washington	(1)
7	Georgia, Maine, New Hampshire, North Carolina, Pennsylvania, Tennessee, Virginia, West Virginia	582,579
8	Alaska	(1)
9	Huron Forest only	113,700

[1] None reported.

The planting in region 6 is probably done by State officials, and therefore no report is made. Region 9 was recently organized and a report was received from only one forest in that region. It is the opinion of the Acting Forester that the total above given therefore falls short of the number of fish actually planted.

DISTRIBUTION CARS

CAR NO. 7

[K. P. Irwin, Captain]

On July 1, 1930, the car left La Crosse for Malta, Colo., to take up the trout distribution from the Leadville station. Several detached messenger trips and four car trips were made to complete the distribution after which the car proceeded to Marquette, Iowa, arriving there on August 4 to take up the distribution from the Mississippi River rescue stations. Several messenger trips and 11 car trips were made from Marquette, Iowa, Lynxville and La Crosse, Wis., to the States of Wisconsin, Iowa, Illinois, Ohio, West Virginia, Pennsylvania, and Virginia. One car trip was made from the Fairport (Iowa) station to West Virginia with pond fishes. The La Crosse distribution was finished with the completion of the Virginia trip and the car returned to La Crosse on November 14.

A boiler watch was maintained for heat and constant watch was kept to prevent the pipes from freezing during the cold winter months. Minor repairs were made to the interior of the car.

On January 27 orders were received to proceed to Charlevoix, Mich., to take up the distribution of whitefish from the hatchery at that point. Three carload shipments were made from Charlevoix, after which the car returned to La Crosse.

Three messenger trips were made from Lynxville, Wis., to Miles City, Mont., with brood bass for the cooperative ponds at that point.

Capt. E. R. Widmyer was made foreman at the Charlevoix (Mich.) station and K. P. Irwin succeeded him on April 1.

The car made five trips and messengers made several detached trips from the La Crosse station between April 1 and May 16 when the car left for Duluth, Minn., to commence the lake trout and pike perch work from that station. Three boat trips with lake trout were made by messenger and five car trips with lake trout and pike perch as well as several detached messenger trips with both lake trout and pike perch were made from Duluth, and the car left on June 2, proceeding to Manchester, Iowa, where a carload of brook trout was picked up and delivered to applicants in Wyoming and to the National Park Service at Gardiner, Mont., to be planted in waters within Yellowstone Park. The car then proceeded to Bozeman, Mont., arriving there on June 13 to take up the trout work from the station there.

A total of 5 carloads were taken from Bozeman, 2 going to Glacier Park, Mont., to be planted in waters within the park, the other 3 being delivered to individual applicants in Wyoming.

During the fiscal year the car made 37 trips traveling 32,253 paid miles and 160 free miles. It handled 41,961,700 fish, filling 1,536 applications widely scattered in 21 States. The number and sizes of the fish delivered by the car and its crew are shown in the following table:

Species	Fry	Fingerlings, Nos. 1 to 6	Yearlings	Adults
Catfish		57,640	105	540
Whitefish	22,170,000			
Rainbow trout		342,200		
Black-spotted trout		149,100		
Loch Leven trout		173,735		
Lake trout	8,645,000	28,000		
Brook trout		2,760,915		
Crappie		65,550		238
Largemouth black bass		154,685		
Smallmouth black bass		1,020		
Sunfish		6,015	5,290	2,350
Pike perch	7,380,000			
Yellow perch		15,860	3,150	390
Total	38,195,000	3,754,720	8,545	3,518

CAR NO. 8

[T. H. COPELAND, Captain]

On July 1, 1930, car No. 8 moved from La Crosse, Wis., to Manchester, Iowa, to complete the unfinished distribution from the Manchester station. The car made two trips from the Manchester station to points in Wisconsin and returned to La Crosse to overhaul the distribution equipment. On August 5 the car loaded at the Lynxville (Wis.) station with bass, crappie, yellow perch, and bream, delivering this load of fish to points in upper Wisconsin, and returning to La Crosse for additional shipments of rescued fishes which were planted in the States of Wisconsin, Illinois, Minnesota, and Pennsylvania. On August 26 the car loaded 21,980 miscellaneous river fishes for the Arizona Game and Fish Commission, delivering the fish at Cutter, Ariz., to be planted in Coolidge Lake. The car moved to the Neosho (Mo.) station September 3 and loaded 7,350 yearling rainbow trout and delivered them to the Arkansas Game and Fish Commission at Mammoth Spring, Ark. On completion of this trip the car returned to Neosho, Mo., and loaded 7,350 yearling rainbow trout for Colorado waters, returned to La Crosse, Wis., and made two trips from that point.

The distribution from the Langdon (Kans.) station began on September 23 and was completed on October 17. During the interim the car made trips from Langdon, Kans., to Ardmore, Oklahoma City, McAlester, Okla., and Nashville, Tenn., delivering approximately 155,000 pond fishes. During October and November the distribution was in progress from the Tupelo (Miss.) station. Pond fishes were delivered in the States of Alabama, Mississippi, Louisiana, Georgia, and Virginia, completing the Tupelo distribution. The car returned to La Crosse, Wis., and resumed the distribution of rescued fishes. On November 25 the car moved to the Milwaukee railroad shops at Milwaukee, Wis., where it remained until March 12 undergoing repairs. The car returned to La Crosse, Wis., March 12 where new aerating equipment was made and installed in the car by members of the crew. The distribution of trout to cooperative ponds and nurseries was commenced April 7 from the La Crosse and Lynxville (Wis.) stations. On completing the cooperative distribution, the general distribution was undertaken from the Manchester (Iowa) station delivering fish to applicants in Wisconsin, Iowa, and Minnesota until the close of the fiscal year.

During the year the car traveled 25,133 paid miles, made 26 complete trips, and delivered fish in 31 States. Detached trips made by messengers operating from the car numbered 125. The messengers traveled approximately 60,000 miles away from the car. The following tabulations will show the number, size, and species of fish delivered by the car and messengers:

Species	Adults	Fingerlings				Yearlings
		No. 1	No. 2	No. 3	No. 4	
Brook trout			926,900	210,100		
Bream	200	46,550	79,630	209,895	1,960	4,415
Catfish		4,800	3,800	11,150		1,615
Catfish (channel)					1,200	
Crappie		3,200	23,550	22,236	20,200	
Loch Leven trout			60,500	21,000	400	
Largemouth black bass	30		25,650	123,005	40,875	16,879
Rainbow trout		26,000	220,450	35,400	14,700	
Yellow perch			800	4,625	2,148	2,325
Total	230	80,550	1,341,280	637,411	81,483	25,234

CAR NO. 9

[F. W. A. ENGLEHARDT, Captain]

Car No. 9 began the fiscal year with the trout distribution from the Bozeman (Mont.) station, making trips within Montana and the States of Washington, Idaho, and Wyoming. Late in August the car proceeded to Miles City, Mont., to take up the distribution of the warm-water species. Trips were made from Miles City to points in Montana, Utah, Idaho, Colorado, North and South Dakota, Wyoming, and Nebraska. The car returned to Bozeman early in November and received trout for applicants in Nebraska and specimens for Central Station, Washington, D. C., Lincoln Park, Chicago, Ill., and La Crosse, Wis. On November 13 the car proceeded from La Crosse to Marquette to receive a load of black bass, bream, crappie, catfish, and yellow perch. This load was taken to Globe, Ariz., the car returning to Bloomington, Ill., where it was placed in the Chicago and Alton railroad shops for annual repairs.

The car arrived at Northville, Mich., on April 9 and after making three trips from the Northville station, it proceeded to Erwin, Tenn., to take up the distribution of trout from the Erwin station. The final trip from Erwin was to Allentown, Pa., from which point the car returned to Wytheville, Va., and obtained a carload of trout from the Wytheville station for waters in the vicinity of Scranton, Pa. From Scranton the car proceeded to Nashua, N. H., and Bucksport, Me. The fiscal year ended while the distribution was in progress from the Craig Brook (Me.) station.

During the fiscal year car No. 9 made 50 trips, delivered 13,253 pails of fish to 1,350 applicants and traveled a total of 35,546 miles. Detached messengers made 83 trips. The following tabulation will show the species, size, and number of fish distributed:

Species	Advanced fry	Fingerlings				Yearlings	Adults
		No. 1	No. 2	No. 3	No. 4		
Black-spotted trout		2,539,000					46
Brook trout		896,000	641,400		12,800	250	
Rainbow trout		661,700	327,900	129,840	206,820	2,250	7
Loch Leven trout		13,600	51,340	9,920			18
Golden trout		12,500	200				
Lake trout	30,000						
Grayling							31
Atlantic salmon		679,500					
Landlocked salmon		139,400					
Largemouth black bass				167,525		405	
Crappie			30,450		4,900	750	
Bream		64,350			2,325	5,325	1,720
Yellow perch				1,400		4,610	100
Catfish				15,375			380
Total	30,000	5,006,050	1,051,290	324,060	226,845	13,590	2,302

CAR NO. 10

[E. M. LAMON, Captain]

This car left Washington on July 7 and arrived at Bucksport, Me., on July 8 and took up the distribution from the East Orland (Me.) station. Trips to Calais, Farmington, Houlton, Greenville, Grindstone, and Portland, Me., were made during July. After completing the Portland trip the car was ordered to Great Barrington, Mass.

On August 1, 10,500 fingerling brook trout and 66 adult smallmouth black bass were obtained from the Hartsville (Mass.) station and the car proceeded to Washington, D. C., distributing these fish to applicants in Pennsylvania, Virginia, and West Virginia.

The car was ordered to La Crosse, Wis., on August 16 to take up the distribution of warm-water species from the upper Mississippi River stations. Trips to Champion, Mich., Louisville, Ky., and Altoona and Philadelphia, Pa., were made between August 18 and September 19. After completing the Philadelphia trip the car was ordered to Fairport, Iowa. On September 24 a carload of miscellaneous warm-water fishes was taken on at Fairport and the car proceeded to Albany, N. Y., distributing these fish to various points in New York State. After completing the trip the car returned to La Crosse, Wis., and loaded with miscellaneous warm-water fishes for Union City, Pa. This trip was completed on October 7 and the car returned to Fairport, Iowa.

On October 11, a load of warm-water species was taken on at Fairport and the car proceeded to Lynchburg, Va., distributing these fish to points in Kentucky, Virginia, and West Virginia. After completing the Lynchburg trip the car was ordered to return to the upper Mississippi River stations and procure a load of miscellaneous warm-water species for points in New Jersey and Virginia. On October 21, a carload of pond fishes was obtained from the Bellevue (Iowa) and Marquette (Iowa) substations and the car proceeded to Elizabeth, N. J., forwarding the fish to points in Virginia by messengers from Washington, D. C. After completing this trip the car returned to Washington.

On October 25, the car was ordered to Lake Park, Ga., arrived at that point on the morning of October 28, and loaded with bass and bream for a trip to Richmond, Va. After distributing these fish the car was ordered to return to La Crosse, Wis. On November 15, a load of miscellaneous warm-water fishes for distribution and specimens for Central Station were taken on at Lynxville, Wis., and the car proceeded to Washington, D. C. After completing this trip members of the crew were granted annual leave or detailed to fish-cultural stations.

Part of a crew was assembled on the car during the first part of January to make minor repairs on the interior of the car. Repairs to trucks, brake cylinder, triple valve, etc., were made by the Washington Terminal Co.

The car was ordered to Great Barrington, Mass., on April 10, and arrived at that point on April 11. On April 14, 200,000 fingerling brook trout and 400 adult brook trout were obtained from the Hartesville (Mass.) station and 50,000 brook trout were obtained from the Nashua (N. H.) station. The car proceeded to Williamsport, Pa., distributing these fish to cooperative nurseries and applicants in Pennsylvania. After completing this trip the car returned to White Sulphur Springs, W. Va., and made trips from that point to Scranton and Pittsburgh, Pa. After completing the Pittsburgh trip the car returned to Erwin, Tenn. On May 6, a carload of trout was obtained from the Erwin station and the car proceeded to Williamsport, Pa. These fish were delivered to applicants in the vicinity of Williamsport. After completing this trip the car returned to Wytheville, Va. On May 13, a shipment consisting of fingerling brook trout and rainbow trout was taken on at Wytheville and the car proceeded to Connellsville, Pa. After completing the Connellsville trip the car returned to White Sulphur Springs, W. Va., and took up the distribution from that station.

Between May 18 and June 27, trips to Durbin, W. Va., Cumberland, Md., and Johnsonburg, Oil City, Altoona, and Philadelphia, Pa., were made by the car from White Sulphur Springs.

During the fiscal year car No. 10 made 29 trips with fish and traveled 31,841 miles. Detached messengers operating from the car made 140 trips and traveled approximately 31,000 miles. The following tabulation will show the number, size, and species of fish delivered.

Species	Fry	Fingerlings					Yearlings	Adults
		No. 1	No. 2	No. 3	No. 4	No. 5		
Catfish			5,400	21,800	2,450		700	735
Suckers								15
Atlantic salmon			88,800					
Landlocked salmon			65,500					
Rainbow trout			341,400					
Loch Leven trout		200,000	83,300					
Brook trout		458,400	817,400	10,500				400
Black-spotted trout								26
Grayling								20
Crappie		3,650	35,005				615	332
Largemouth black bass			19,820	64,050	23,225	10,800	1,235	200
Smallmouth black bass			8,020					
Sunfish		11,700	12,000	120	1,645		9,065	2,122
Pike perch	1,500,000							10
Yellow perch				2,820	1,500		240	725
Total	1,500,000	673,750	1,476,645	99,290	28,820	10,800	11,855	4,585

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